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Optimizing postoperative outcomes after gastric bypass surgery-the influence of dietary protein and its amino acid composition

Van Den Broek, M.; De Heide, L.J.M.; Veeger, N.J.G.M.; Van Der Wal-Oost, A.M.; Van Beek, A.P.

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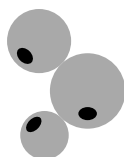
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European Obesity Summit (EOS) – Joint Congress of EASO and IFSO-EC

Gothenburg, Sweden, June 1 – 4, 2016

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JOINT PLENARY LECTURES

Wednesday, 1 June, 2016

JOPL - Joint Opening Plenary Lecture: Lessons from SOS

Carlsson L

Institute of Medicine, The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden

Background and aims The Swedish Obese Subjects (SOS) study is a prospective, controlled intervention trial examining effects of bariatric surgery on mortality and other hard endpoints. The surgery group (n=2010) underwent gastric banding (n=376), vertical banded gastroplasty (n=1369), or gastric bypass (n=265). Controls (n=2037) received customary obesity treatment. The study is ongoing and has a mean follow-up of over 20 years. Inclusion criteria were age 37–60 years and BMI >34 in men and >38 in women. Anthropometry, blood pressure, biochemical variables and electrocardiography were measured at regular intervals and participants complete questionnaires capturing lifestyle factors. Drug use, inpatient and outpatient care, cancer and mortality are traced by searching Swedish National Health Registers.

Results from the SOS study have shown that bariatric surgery reduces premature mortality,¹ incidence of cancer,² myocardial infarction and stroke,³ prevents diabetes,⁴ and induces diabetes remission and prevents diabetes complications.⁵ For health-care costs^{6,7} we observe drug cost savings after surgery in patients with diabetes and prediabetes, and cost-neutrality for overall healthcare costs for surgery versus usual care for patients with diabetes.⁷ My lecture will summarize published results and recent unpublished data from the SOS study.

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Disclosure: L. Carlsson has obtained lecture fees from AstraZeneca, Johnson&Johnson and MSD.

Thursday, 2 June, 2016

PL1 – When do you treat Type II Diabetes with Surgery

PL1.01

What is the evidence of BMI?

Schauer, P.

USA

The observation that bariatric or metabolic surgery can lead to full diabetes remission or substantial improvement was evident in the 1990's; yet it was not until 2009 that major diabetes organizations such as the American Diabetes Association included metabolic surgery as a treatment modality for type 2 diabetes (T2DM). Due to limited randomized controlled trials comparing surgery to medical treatment of T2DM and limited long-term results, such guidelines were relatively weak in supporting surgical treatment. Since 2009, 11 RCT's comparing surgery to medical treatment of T2DM have been published in high impact journals including NEJM and JAMA. These studies with follow-up duration of 1–5 years involve nearly 1000 patients without surgical mortality, and major complication rates of less than 5% and reoperation rate of 8%. All 11 RCT's have shown superiority of surgery over medical management at achieving remission or glycemic improvement. In addition, the Swedish Obesity Subject study (non-randomized) and 9 other comparative studies (non randomized) have shown either reduction in all cause mortality, and/or reduction in CV morbidity/mortality and microvascular complications associated with surgery vs. medical management of T2DM. At the 2015 London Diabetes Surgery Summit new guidelines for surgery based on current evidence have been proposed. Based on such evidence, metabolic surgery is recommended to treat T2DM in patients with Class III obesity (BMI ≥40 kg/m²) and in those with Class II obesity (BMI 35.0–39.9 kg/m²) when hyperglycemia is inadequately controlled by lifestyle and optimal medical therapy. Surgery should also be considered for patients with T2DM and BMI 30.0–34.9 kg/m² if hyperglycemia is inadequately controlled despite optimal treatment with either oral or injectable medications. These BMI thresholds should be reduced by 2.5 kg/m² for Asian patients.

PL1.02

Metabolic surgery in the treatment algorithm for type 2 diabetes: A Joint Statement by International Diabetes Organizations

Francesco Rubino,* David M. Nathan, Robert H. Eckel, Philip R. Schauer, K. George Alberti, Paul Z. Zimmet, Stefano Del Prato, Linong Ji, Shaikat M. Sadikot, William H. Herman, Stephanie A. Amiel, Lee M. Kaplan, Gaspar Taronger-Oldenburg, David E. Cummings*
Writing on Behalf of the Delegates of the 2nd Diabetes Surgery Summit
*FR and DEC chaired the writing committee for this report.

Background. Despite growing evidence that bariatric/metabolic surgery powerfully improves type 2 diabetes (T2DM), existing diabetes treatment algorithms do not include surgical options.

Aim. The second Diabetes Surgery Summit (DSS-II), an international consensus conference, was convened in collaboration with leading dia-

betes organizations to develop global guidelines to inform clinicians and policy makers about benefits and limitations of metabolic surgery for T2DM.

Methods. A multidisciplinary group of 47 international clinicians/scholars (75% non-surgeons), including representatives of leading diabetes organizations, participated in DSS-II. After evidence appraisal (MEDLINE 1/1/2005-9/30/2015), three rounds of Delphi-like questionnaires were used to measure consensus for 32 data-based conclusions. These drafts were presented at the combined DSS-II and 3rd World Congress on Interventional Therapies for Type 2 Diabetes (London, 9/28/2015-9/30/2015), where they were open to public comment by other professionals and amended face-to-face by the Expert Committee.

Results. Given its role in metabolic regulation, the gastrointestinal tract constitutes a meaningful target to manage T2DM. Numerous randomized clinical trials, albeit mostly short/mid-term, demonstrate that metabolic surgery achieves excellent glycemic control and reduces cardiovascular risk factors. Based on such evidence, metabolic surgery should be recommended to treat T2DM in patients with Class III obesity (BMI \geq 40 kg/m²) and in those with Class II obesity (BMI 35.0–39.9 kg/m²) when hyperglycemia is inadequately controlled by lifestyle and optimal medical therapy. Surgery should be considered for patients with T2DM and BMI 30.0–34.9 kg/m² if hyperglycemia is inadequately controlled despite optimal treatment with either oral or injectable medications. These BMI thresholds should be reduced by 2.5 kg/m² for Asian patients.

Conclusions. Although additional studies are needed to further demonstrate long-term benefits, there is sufficient clinical and mechanistic evidence to support inclusion of metabolic surgery among anti- γ -diabetes interventions for people with T2DM and even just mild obesity. Healthcare regulators should introduce appropriate reimbursement policies.

PL1.03

Role of the gut on glucose homeostasis: lesson learned from metabolic surgery

Mingrone G

Department of Internal Medicine, Catholic University of Rome, Italy

Bariatric surgery was initially intended to reduce weight, and only successively the remission of type 2 diabetes was observed as a collateral event. At the moment the term “metabolic surgery” is used to underline that this type of surgery is performed specifically to cure diabetes and its metabolic complications, such as hyperlipidemia.

Randomized, controlled studies have recently supported the use of bariatric surgery, and in particular of Roux-en-Y gastric bypass (RYGB) and bilio-pancreatic diversion (BPD) as an effective treatment for decompensated type 2 diabetes. The lesson learned from these randomized and many other non-randomized clinical studies is that the stomach and the small intestine play a central role in glucose homeostasis.

The bypass of the duodenum and a shorter or longer tract of the jejunum exert a different impact on insulin sensitivity and secretion. In fact, while BPD, where the duodenum, the entire jejunum and a small portion of the ileum are bypassed from nutrient transit, reverses to normal insulin sensitivity thus reducing insulin secretion, RYGB has a little effect on insulin resistance but increases insulin secretion. The hypotheses concerning the mechanism of action of metabolic surgery on diabetes remission vary from the jejunal nutrient sensing to the incretin action to the blunted secretion of putative insulin resistance jejunal hormone/s to changes in the microbiota.

In any case, the metabolic surgery has the undoubted merit to show that the small intestine plays a central role in insulin sensitivity and glucose homeostasis.

PL1.04

Critical evaluation of metabolic surgery in obese diabetic patients

Scherthaner G

Department of Medicine I, Medical University of Vienna, Vienna, Austria

According to the early meta-analysis of Buchwald (1) a high remission (80%) of type 2 diabetes (T2DM) was assumed after bariatric surgery (BS), but more than 50% of the patients were lost in the short follow-up of only two years. In a recent review (2) only 6 diabetes studies out of 7.877 BS reports could be identified with a follow up of 80% of the entire study cohort for at least 2 years. More recent studies (3-5) show much lower remission “rates of only 7-42% after BS in T2DM patients. Since several studies have demonstrated that patients with more severe and less well-controlled T2DM, as determined by insulin use, high HbA1c and/or fasting glucose level and/or longer duration of disease are less likely to experience remission of T2DM after BS, the use of the recently described diabetes remission score might be helpful (6) to select T2DM patients who have the best outcome. Remarkably, longer observation studies indicate also a re-occurrence of T2DM associated with regain of body weight. A recent prospective UK study (7) of 826 obese T2DM patients showed a remission (HbA1c<6.5%) in 45% after two years, which declined to only 25% six years after BS. Thus, the cure of diabetes by surgery remains „an unrealistic dream“ (8, 9). Careful long-term follow up for malnutrition, anemia, hypoglycemia and hypocalcemia as well as optimal antidiabetic therapy for non-responders is mandatory.

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Disclosure: No conflict of interest declared

Friday, 3 June, 2016

PL4 – Effects of obesity and bariatric surgery on pregnancy

PL4.01

Effect of obesity on mother and child

[No abstract]

PL4.02

Does bariatric surgery improve pregnancy outcomes

Johansson, K.

Department of Medicine, Solna, Clinical Epidemiology Unit, Karolinska Institutet, Stockholm, Sweden

Background: There is a growing number of pregnancies occurring after bariatric surgery, but the effects of bariatric surgery on reproductive outcomes are unclear as large-scale studies are lacking. Method: Using Swedish nationwide health registers and the Scandinavian Obesity Surgery Register (SOReg), we identified women who had undergone bariatric surgery prior to pregnancy. Between 2006 and 2011, 627,693 singleton pregnancies were identified in the Swedish Medical Birth Register of which 670 occurred after bariatric surgery in women for whom pre-surgery weight was documented. For each pregnancy after bariatric surgery,

up to 5 control pregnancies were matched by pre-surgery BMI, age, parity, smoking, education, and delivery year. We assessed risks for gestational diabetes, large-for-gestational-age (LGA), small-for-gestational-age (SGA), preterm birth, stillbirth, neonatal death, and major congenital malformations.

Results: Compared to control pregnancies, pregnancies in women with prior bariatric surgery were associated with lower risks for gestational diabetes (1.9% vs. 6.8%; $P < 0.001$), and LGA birth (8.6% vs. 22.4%; $P < 0.001$). In contrast, higher risk was observed for SGA birth (15.6% vs. 7.6%; $P < 0.001$). Post-surgery pregnancies had shorter length of gestation (273.0 vs. 277.5 days; $P < 0.001$) and a borderline increased risk for the combined outcome stillbirth and neonatal death (1.7% vs. 0.7%; $P = 0.056$). No statistically significant association could be detected between bariatric surgery and congenital malformations.

Conclusion: Bariatric surgery is associated with both positive and negative pregnancy and perinatal outcomes.

PL4.03

Complications and compliancy problems during pregnancy

[No abstract]

PL4.04

Surgical Challenges during pregnancy and at delivery

[No abstract]

Saturday, 4 June, 2016

PL9 – Long term effects of bariatric surgery

PL9.01

Improvements in NAFLD

Pattou F

European Genomic research Institute for Diabetes, Lille University, Lille, France

Background and aims The effects of bariatric surgery in patients with non-alcoholic fatty liver disease (NAFLD) are not well established. We performed a prospective study to determine the biologic and clinical effects of bariatric surgery in patients with NASH. Participants consisted of 1236 obese patients (body mass index = 48.4 ± 7.6 kg/m²), enrolled in a prospective longitudinal histological study for up to 5 years after bariatric surgery. At baseline, NAFLD was present in 86% patients and categorized as advanced [NAFLD activity score (NAS) ≥ 3] in 22% patients. When analyzed with a mixed model, all NAFLD parameters improved after surgery ($P < 0.001$) and improved significantly more after RYGB than after AGB. In multivariate analysis, the superiority of RYGB was primarily but not entirely explained by weight loss (Caiazzo et al Ann Surg 2014;260:893-8). In patients with proven NASH, surgery induced the disappearance of the disease from nearly 85% of patients (Fig.1) and reduced the pathologic features of the disease, after 1 y of follow up (Lassailly et al. Gastroenterology 2015;149:379-88). Finally, in patients with advanced NAFLD and initial remission after surgery, disease progressed in 1 out of 3 cases between 1 and 5 years, in association with impaired glucose control independently of weight regain. In conclusion, bariatric surgery could be a valid therapeutic option for appropriate, morbidly obese patients with advanced NAFLD who do not respond to lifestyle modifications.

Figure 1: Distribution of NASH inflammatory activity grade (severity) before and 1 year after surgery, according to the Brunt score. $P < 0.0001$ Wilcoxon signed rank test between before and after surgery (Lassailly et al. Gastroenterology 2015;149:379-88)

Disclosure: No conflict of interest declared

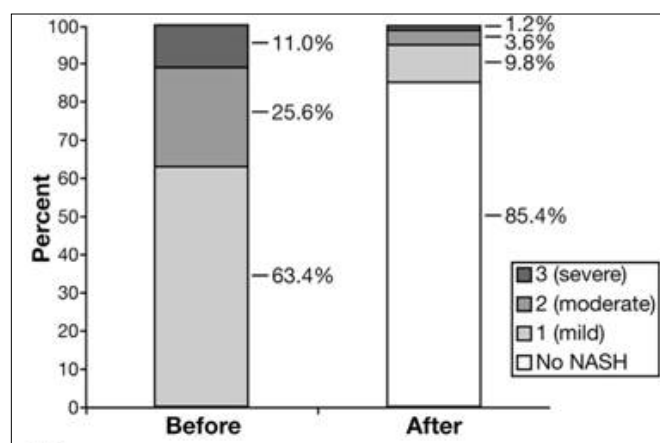


Fig. 1

PL9.02

Changes in Psychosocial Functioning Following Bariatric Surgery

Sarwer, DB.

Perelman School of Medicine at the University of Pennsylvania, Pennsylvania, USA

Bariatric surgery typically results in dramatic weight loss and profound improvement in weight-related comorbidities. In general, psychosocial status and functioning also improve. The majority of patients report dramatic improvements in quality of life, self-esteem, body image and depressive symptoms, as well as other areas of functioning. These changes typically occur in the first few months after surgery and before patients have reached their maximum weight loss. Many of these changes are well maintained over time, however, some appear to deteriorate particularly if patients regain weight. However, a small minority of patients experience psychosocial challenges after bariatric surgery. These include body image dissatisfaction secondary to loose, redundant skin, issues with romantic relationships, and substance abuse. Others experience a return of disordered eating or struggle with adherence to the recommended postoperative diet, both of which may contribute to weight regain. This presentation will review the literature in these areas as well as provide suggestions on monitoring psychosocial issues after surgery. In addition, the presentation will discuss the developing literature on psychosocial and behavioural interventions designed to optimize outcomes after bariatric surgery.

PL9.03

Effects on CVD and its risk factors

[No abstract]

PL9.04

Kidney Diseases in Obesity and Bariatric Surgery

Mingrone G

Department of Internal Medicine, Catholic University of Rome, Italy

Obesity-related glomerulopathy (ORGP) is a secondary form of focal and segmental glomerulosclerosis, which comes to clinical attention when proteinuria and progressive renal dysfunction develop. ORGP is defined as a proteinuric renal disease in subjects with a body mass index (BMI) ≥ 30 kg/m² in the absence of other known renal diseases evidenced both clinically and histopathologically. Biopsy proven glomerulopathy demonstrates an exponential increase of ORGP from 0.2% in 1986–1990 to 2.0% in 1996–2000. Weight loss apparently represents the only therapeutic approach to ORGP and, indeed, it was found to be associated with a signif-

icant reductions in urinary protein excretion. However, the information deriving from clinical trials are poor.

Bariatric-metabolic surgery demonstrated its efficacy in improving diabetic nephropathy in both short and long term studies. However, bariatric-metabolic surgery is also associated with stones formation, pyelonephritis and in some cases progression to renal failure.

Although nephropathy in its different forms is a relevant complication of obesity and related disorders, in particular type 2 diabetes, few studies have addressed this important clinical, healthcare and economic problem in a systematic way.

JOINT REVIEW/WORKSHOP SESSIONS

Thursday, 2 June, 2016

RS15 – Mechanisms in bariatric surgery

RS15.01

Gut hormones

Holst, JJ.

Denmark

SUSTAIN 4, the third phase 3a trial for semaglutide to report results, included a total of 1,089 people with type 2 diabetes previously treated with metformin with or without sulfonylurea. From a mean baseline, HbA1c of 8.2%, people treated once-weekly with doses of 0.5 mg and 1.0 mg semaglutide achieved statistically significant and superior improvements in HbA1c of 1.2% and 1.6%, respectively, compared to 0.8% with insulin glargine after 30 weeks of treatment. The mean daily insulin glargine dose was 29 units. Furthermore, from a mean baseline body weight of 93 kg, people treated with 0.5 mg and 1.0 mg semaglutide experienced statistically significant and superior weight loss of 3.5 kg and 5.2 kg, respectively, compared with a weight gain of 1.2 kg with insulin glargine. In the trial, semaglutide appeared to have a safe and well-tolerated profile. The most common adverse event was nausea which diminished over time. Nausea was reported by up to 22% of people treated with semaglutide compared with 4% of people treated with insulin glargine. Severe or blood glucose-confirmed symptomatic hypoglycaemia was experienced by 4% and 6% of people treated with 0.5 mg or 1.0 mg once-weekly semaglutide, respectively, compared with 11% in the insulin glargine group.

Mechanisms of bariatric surgery: Gut Hormones

Bariatric surgery in the form of gastric bypass operations has massive effects on the secretion of gastrointestinal hormones. The following changes have been observed with careful measurements using validated assays: Ghrelin, at first decreases later normalizes; gastrin, marked decreases; somatostatin, no changes; secretin and cholecystokinin, marked increases; Glucose-dependent insulinotropic polypeptide (GIP), no consistent changes; neurotensin (total), marked increases; Glicentin, oxyntomodulin, GLP-1 (total and intact), GLP-2 (intact), dramatic increases; PYY (1–36 + 3–36), dramatic increases. Among the pancreatic hormones both insulin and glucagon show marked increases. The GLP-1 effects may be analyzed using the GLP-1 receptor antagonists, and the PYY 3–36 effects may be evaluated using DPP-4 inhibitors preventing the conversion of PYY 1–36 to 3–36. All studies consistently show that the exaggerated GLP-1 secretion is essential for the augmented insulin response and also is responsible for postoperative reactive hypoglycaemia. GLP-1 receptor blockade alone does not augment food intake postoperatively (but does so preoperatively), and blockade of PYY conversion also has no effect alone, but the combined blockade augments food intake by 20%, consistent with effect of somatostatin (which blocks the secretion of all hormones) and perhaps with a potentiating interaction between the two hormones. It is likely that some of the other hormones also contribute both to augmentation of insulin secretion (secretin + oxyntomodulin), and to the inhibition of food intake (oxyntomodulin, glucagon, neurotensin). It is concluded that the gut hormones play an important role for the outcome of the bypass operations.

RS15.02

Bile diversion and intestinal glucose uptake

Pattou F

European Genomic research Institute for Diabetes, Lille University, Lille, France

Background and aims Gastro-intestinal exclusion by Roux-en-Y gastric bypass (RYGB) improves glucose metabolism, independent of weight loss. Although changes in intestinal bile trafficking have been shown to play a role, the underlying mechanisms are unclear. We performed RYGB in minipigs and showed that the intestinal uptake of ingested glucose is blunted in the bile-deprived alimentary limb (AL). Glucose uptake in the AL was restored by the addition of bile, and this effect was abolished when active glucose intestinal transport was blocked with phlorizin. Sodium-glucose cotransporter 1 remained expressed in the AL, while intraluminal sodium content was markedly decreased. Adding sodium to the AL had the same effect as bile on glucose uptake. It also increased postprandial blood glucose response in conscious minipigs following RYGB. The decrease in intestinal uptake of glucose after RYGB was confirmed in humans. Our results demonstrate that bile diversion affects postprandial glucose metabolism by modulating sodium-glucose intestinal cotransport

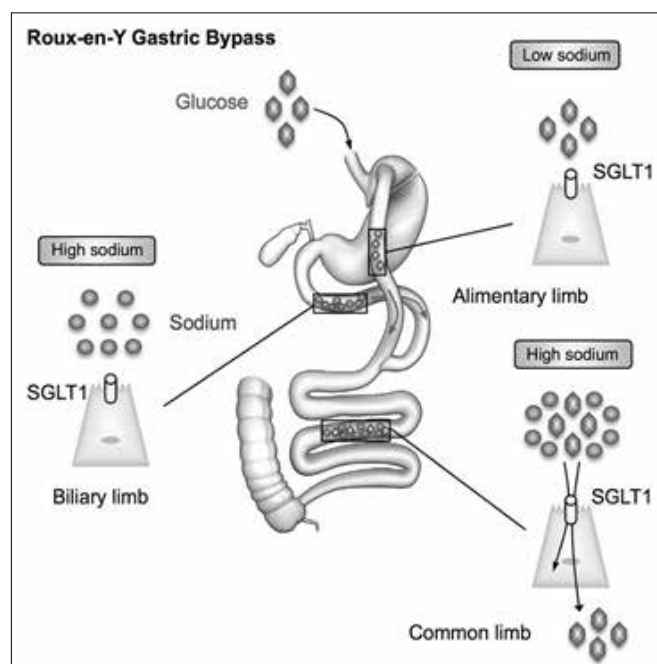


Fig. 1 The beneficial metabolic consequences of bariatric surgery independent of weight loss remain largely unexplained. We identify sodium as a key factor and show that Roux-en-Y gastric bypass decreases the amount of sodium normally brought into the intestine with bile, thereby impairing intestinal glucose uptake via sodium-glucose cotransport (Baud et al. Cell Metabolism 2016).

Disclosure: No conflict of interest declared

RS15.03

Mechanisms underlying reversal of diabetes by calorie restriction alone

Taylor, R.

For people who had had type 2 diabetes for less than 10 years it is now clear that the condition is reversible by weight loss of around 15%. Provided weight regain is avoided, diabetes stays away long term. The underlying mechanism has been defined. Within days of starting a hypocaloric diet, liver fat levels fall. Over 8 weeks of a very low calorie diet (around 700 kcal/day), the level of fat within the pancreatic tissue falls. This change is unique to people with type 2 diabetes undergoing weight loss, and does not occur in non-diabetic individuals. In step with the fall in pancreas fat levels, first phase insulin response normalizes. These changes are irrespective of the level of BMI but are determined by a personal fat threshold. Thus after reversal of diabetes, 50% of people still have a BMI over 30, and can be advised to avoid weight regain without concern about a "high" BMI. BMI was introduced as a population metric and is only a rough guide for individuals.

RS15.04

Changing reward pathways

Goldstone, T.

United Kingdom

Roux-en-Y gastric bypass (RYGB) surgery is an effective long-term weight loss intervention. Its success appears to relate not only to a reduced appetitive drive, but also a change in food preference, hedonic responses and reward responses towards food. Thus obese patients after RYGB had lower brain-hedonic responses to food than patients after gastric banding surgery. RYGB patients had lower activation than patients in brain reward systems, particularly to high-energy foods, including the orbitofrontal cortex, amygdala, caudate, nucleus accumbens in a functional MRI food picture evaluation task. This was associated with lower palatability and appeal of high-energy foods and healthier eating behaviour, including less fat intake, in RYGB compared with patients after gastric banding and/or BMI-matched unoperated controls. These differences were not explicable by differences in hunger between the surgical groups. Post-prandial exaggerated satiety gut hormone responses have been implicated as potential mediators. Acute suppression of post-prandial PYY and GLP-1 with somatostatin analogue Octreotide increased both appetitive food reward (breakpoint) in a behavioural progressive ratio task and increased food appeal and reward system activation in a functional MRI food evaluation task, in patients after RYGB group. This was absent in in control non-obese or gastric banding surgery patients. Furthermore the reduction in plasma PYY and GLP-1 with Octreotide positively correlated with the increase in brain reward system activation in patients after bariatric surgery. Enhanced satiety gut hormone responses after RYGB may thus be a causative mechanism by which anatomical alterations of the gut in bariatric surgery modifies behavioural and brain reward responses to food. Potential roles for other mediators such as conditioned aversion, duodenal-jejunal exclusion, changes in bile acids and FGF-19, gut microbiome, remain to be elucidated. Changes in other addictive behaviours such as emotional reactivity and mood may also be beneficial consequences of surgery. Interestingly, a subset of patients appears to be detrimentally affected by this loss of reward from food and by a lack of alternative strategies for regulating mood after RYGB. Such patients might be at increased risk of problems such as alcohol dependence.

Saturday, 4 June, 2016

RS28 – Mental health and behaviour after bariatric surgery

RS28.01

The Psychosocial Burden of Obesity

Sarwer, DB.

Perelman School of Medicine at the University of Pennsylvania, Pennsylvania, USA

Obesity, and extreme obesity in particular, is frequently accompanied by a substantial psychosocial burden that further complicates the disease. Individuals with extreme obesity, as compared to those of normal body weight, are more likely to suffer with several forms of psychopathology. They typically report reduced quality of life and self-esteem, as well as higher rates of depressive symptoms and body image dissatisfaction. Individuals with extreme obesity also are more likely to report a history of disordered eating, substance abuse as well as physical and sexual abuse. All of these experiences can influence an individual's decision to seek surgery. This presentation will review the relationship between extreme obesity and these psychosocial issues. In addition, the presentation will focus on the potential impact of these issues on postoperative outcomes, both weight loss as well as psychosocial adjustment.

RS28.02

Hedonic reward

[No abstract]

RS28.03

Food palatability

[No abstract]

PLENARY LECTURES

Thursday, 2 June, 2016

PL2 – EASO Plenary Session

PL2.01

Sustainable choices

Stancliffe, R.

United Kingdom

Do you think that obesity is the biggest problem we face? It is unquestionably a massive global challenge, and it's rather more complicated than merely the result of stuffing ourselves with too much food. But climate change is an even bigger problem, that has been described by both the World Health Organisation and the recent Lancet commission as 'the biggest threat to global health in the 21st century'. Current biomedical research and health systems are not sustainable. Current obesity services are not sustainable. The challenge posed by last year's Paris climate talks and the commitments to reducing carbon emissions made by 197 countries presents us with a huge opportunity to be transformative in our approaches and to create better and more sustainable care. In this session I will explore how obesity and climate change are related and how we can progress much more quickly in both fields by recognising the links and developing sustainable responses across both healthcare and public health. Sustainable healthcare is the ability to provide good quality care for future generations by balancing the economic, environmental, and social constraints and demands within health care settings, sometimes called the triple bottom line.

The four principles of sustainable clinical practice are:

1. Prevention
2. Patient empowerment and self care
3. Lean systems
4. Low carbon alternatives

Since 2008 the Centre for Sustainable Healthcare has been exploring methodologies and metrics to transform models of care for a sustainable future. We work with healthcare professionals, researchers, patients and the wider community to increase the connections between health and environment, and to reduce healthcare's resource footprint. Our range of programmes provides tools and resources to empower and enable individuals and groups to transform practice and develop sustainable models of care. Recognising that the natural community of practice in healthcare is most often the specialty, the Centre has developed its much acclaimed clinical sustainable specialties programme. Come and explore how these principles can be applied to your work and how you can become a leader in this exciting new field of sustainable clinical or public health practice.

Friday, 3 June, 2016

PL5 – Re-thinking Appetite Regulation: the role of Energy Expenditure and its relationship to Energy Intake

PL5.01

Re-thinking Appetite Regulation: The role of Energy Expenditure and its relationship to Energy Intake

Blundell, J.E.

United Kingdom

More than 50 years ago it was proposed that 'the differences between the intakes of food must originate in the differences in energy expenditure' and that this relationship could form the basis for appetite control (Edholm, Fletcher, Widdowson and McCance et al, 1955 p 297). Over a 15 year period, we have investigated this issue by studying appetite control within an energy balance framework using a multi-level experimental platform (Caudwell et al, 2011). In several cohorts of obese subjects (male and female) it has been demonstrated that FFM, but not FM or BMI, has a positive relationship with self-determined meal size and daily EI (Blundell et al, 2011). This finding has been independently confirmed by several independent research groups (eg Weisse et al, 2013). FFM is the primary determinant of RMR and accounts for about 60% of the variance (FM accounts for approximately 7%). RMR has also been shown to be positively associated with meal size and daily EI (Caudwell et al, 2013) and with the profile of hunger across the day. An interpretation of these findings is that the body's energy requirements contribute to the motivation underlying food intake, and suggest that the 'regulation' of food intake is not entirely under the control of adipose tissue, and that the model for control of food intake should be revised (Blundell et al, 2012). We propose that adipose tissue has a biologically inhibitory effect on EI but this effect weakens (permitting overconsumption) as AT mass increases (and insulin and leptin sensitivity decrease). This formulation helps to explain why obese people continue to eat more than normal weight people and to experience strong hunger despite having large stores of energy in the body. The observations suggest that the demand for energy should be considered as one of the drivers of appetite. The energy balance framework also posits a relationship between physical activity and appetite. Sedentary behaviour is clearly associated with increased adiposity and exerts a disinhibitory effect on eating (allowing or promoting overconsumption). In contrast an increased level of physical activity (and energy expenditure) improves appetite regulation. Both metabolic and behavioural components of EE exert effects on Appetite regulation, and this offers new ways of thinking about energy balance and obesity.

Saturday, 4 June, 2016

PL7 – Pros and cons of the diagnosis of Food Addiction for tackling the obesity epidemic

PL7 .01

Pros and cons of the diagnosis of Food Addiction for tackling the obesity epidemic

[No abstract]

REVIEW/WORKSHOP SESSIONS

Wednesday, 1 June, 2016

RS1 – Personalised treatment of obesities

RS1.01

Using Epigenetics

[No abstract]

RS1.02

Using Omics

Roche, H.

UCD Institute of Food & Health, University College Dublin, Ireland

Age, genetics, dietary exposure and lifestyle are important determinants of obesity and metabolic health; which in turn modulate risk of Type 2 Diabetes (T2D) and Cardiovascular Disease (CVD). However, there is potential for vast metabolic diversity – which may discriminate between future high versus low T2D and CVD risk. Nutrigenomics approaches provide the opportunity to comprehensively define the metabolic phenotype (or personalised signature) integrating multiple metabolic and molecular profiles (at the gene, transcriptome, proteome and metabolome levels). This level of detail is essential since nutritional exposure, metabolism and molecular physiology vary continually. Examples wherein nutrigenomic approaches have provided greater detail, particularly in relation to metabolic diversity will be presented, in terms of illustrating proof-of-concept. The Personalised Nutrition concept seeks to improve the selection of nutritional interventions / therapies for sub-groups with a view to attaining greater efficacy. Again factors including age, gender, nutritional environment, lifestyle and multiple-omic responses interact to define an individual's response (or not!) to lifestyle intervention. Some work provides proof-of-concept that an individual's dietary, metabolic and inflammatory phenotype as well as genetics, determines sensitivity to lifestyle / environmental stressors. Nevertheless, greater clarity in relation to the impact of genomics within nutrition and lifestyle interventions will be discussed; illustrating some research gaps relating to personalisation of treatments and metabolic diversity relating to obesity.

RS1.03

The impact of ethnic background

Sattar, N

University of Glasgow, UK

We know now that certain ethnicities are at significantly elevated risk for diabetes and other metabolic complications for a given level of adiposity. If we take the example of South Asians, this will be a model for understanding challenges in tackling rising levels of obesity in several ethnic communities. As we recently reviewed (1) South Asians, particularly when living in high-income countries, are at significantly elevated risk of type 2 diabetes compared to white Europeans, and typically develop the disease 5–10 years earlier and at a lower body mass index. Migrant South Asians appear more insulin resistant than white Europeans across the life-course and potentially experience beta cell exhaustion at an earlier age. Current evidence suggests that differences in both adiposity (higher percent body fat, greater proportion of deep subcutaneous and visceral fat) and skeletal muscle (lower percent lean mass, lower cardiorespiratory fitness) are likely to contribute. For these reasons, South Asians need to be encouraged and helped (via multiple, culturally efficient methods) to

maintain high physical activity levels and lower body weights across the life-course to prevent diabetes. This talk will discuss the reasons for higher diabetes risks as well as report evidence for interventions (e.g. 2, 3) in both migrant South Asians as well as South Asians living in Asia. In so doing, it will offer helpful insights for future intervention studies.

RS2 – Browning of WAT

RS2.01

Substrate utilisation and metabolic regulation in white and brown adipose tissue.

Enerbäck, S.

University of Gothenburg, Department of Medical Genetics, Gothenburg, Sweden

This presentation sets out to discuss obesity and obesity-related diseases with focus on how activating and stimulating formation of human brown adipose tissue could be a helpful way to treat such conditions. Thus, making use of the unique features of the brown adipose tissue (BAT) organ which has evolved with the sole purpose to generate heat by safely dissipate large amounts of chemical energy – a quality that might be harnessed to help humans deal with a dangerously hyper-caloric environment and still remain in good health. The metabolic role of BAT in humans is far from being fully understood, but once we have revealed the mechanisms involved we may have exciting opportunities to develop new therapies for obesity and obesity related diseases such as type 2 diabetes, cardiovascular diseases and cancers. New data suggests that also other diseases, not immediately associated with metabolic disturbances, such as asthma and osteoporosis are linked to obesity – empathizing the urgent need to develop effective treatments. The key challenges are now to provide new insights that will ultimately lead to novel effective treatments by stimulating BAT formation and activity in humans.

RS2.02

Brown adipose tissue metabolism in man

van Marken Lichtenbelt, W.

The Netherlands

In 2009 the first dedicated cold exposure tests revealed significant brown adipose tissue (BAT) activation in adult humans. Although the tissue was well known in many animal species and also in newborns, it was with the onset of new imaging techniques that the functional BAT in adults could be shown. What do we know about human brown adipose tissue physiology since 2009? This presentation will highlight the most important findings, such as brown fat prevalence and activity, distribution, recruitment, and its role in energy metabolism. Results on cold exposure and acclimation will be shown. Studies in humans reveal significant activation of BAT upon cold and also an increase in BAT activity and volume upon cold acclimation that are related to (changes in) non-shivering thermogenesis. In addition new insights in the function of human BAT will be discussed, such as the potential quantitative contribution of BAT to whole body non-shivering thermogenesis, but also to glucose metabolism and its function as an endocrine tissue. In this respect it is of interest that our recent findings show that cold acclimation in patients with type 2 diabetes and in obese subjects not only affects energy metabolism, but also glucose metabolism and insulin sensitivity. In addition to brown adipose tissue it appears that skeletal muscle plays an important role. Finally, future directions for the studies on human brown adipose tissue will be presented.

RS2.03

Effect of fatty diet, neurodegeneration and intranasal insulin therapy on the brown adipose tissue-hypothalamic axis

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²Institute of Clinical Physiology, National Research Council (CNR), Pisa, Italy

³Fondazione Toscana Gabriele Monasterio, Pisa, Italy

Background&Aims: Brown adipose tissue (BAT) metabolism is regulated by the brain and changes in relation to BMI, age, and prandial state. Our aim was to explore the effects of high-fat diet (HFD), neurodegeneration and brain insulin delivery [intranasal insulin (INI)] on glucose metabolism and hypothalamic control of BAT.

Objective: To investigate by in vivo 2-[18F]-fluoro-2-deoxyglucose Positron Emission Tomography ([18F]-FDG PET), in fasting and acute INI-stimulated condition, glucose uptake (GU) in BAT, hypothalamus and their correlation, in response to HFD, cognitive deterioration and chronic INI treatment.

Materials&Methods: Mice fed a normal diet (ND, n = 19) or HFD (n = 21), and Alzheimer's disease (AD) mice supplied with normal diet (ADND, n = 16), HFD (ADHFD, n = 12) and combined HFD+INI therapy (ADHFD-INI, n = 18), were monitored from 2 to 14 months of age. Cognitive performance was assessed by Y-maze test. [18F]-FDG PET was employed to measure BAT and hypothalamic GU, in fasting and INI-stimulated conditions, in 8 and 14-month-old mice.

Results: Aging and HFD per se did not significantly change BAT GU in fasting and INI-stimulated states. In association with AD, HFD caused an increase in BAT GU during acute brain INI-stimulation ($p < 0.05$, $p < 0.01$ vs ND and HFD mice). This was normalized by chronic INI therapy ($p < 0.01$). Aging and neurodegenerative progression in AD mice was associated with an elevated BAT GU in ADND ($p < 0.01$ vs ND mice), and a suppressed BAT GU in ADHFD mice ($p < 0.01$). This was modestly improved by chronic INI therapy ($p = 0.12$, Fig.1). A positive association was observed between BAT and hypothalamic fasting GU in all groups ($r > 0.7$, $p < 0.03$), and following acute INI-stimulation only in ND and HFD mice ($r \geq 0.9$, $p < 0.005$), but not in AD and ADHFD mice. This relationship was restored by chronic brain INI therapy.

Conclusion: In ND and HFD-fed mice, the metabolic activity of BAT is related to that of the hypothalamus. This relationship is partially lost in AD mice. In Alzheimer's disease, BAT GU is elevated by high-fat feeding and aging. Chronic INI therapy contributes to preserve BAT metabolism and the BAT-hypothalamic axis during neurodegenerative progression.

RS2.04

Aspiration therapy for obesity; two year results and quality of life

Norén, E.; Forssell, H.

Department of Surgery, Blekingesjukhuset, Karlskrona, Sweden

Background: This study aims to evaluate efficiency, quality of life and safety of the novel AspireAssist® Aspiration Therapy System for obesity. This report adds quality of life and two-year data compared to our previous presentation at IFSO 2014.

Methods: A prospective observational study with 25 obese subjects was performed. A custom gastrostomy tube (A-tube, Aspire Bariatrics) was percutaneously inserted during a gastroscopy performed under conscious sedation. Drainage and irrigation of the stomach were performed three times daily, 20 minutes after meal, for one to two years, along with a cognitive behavioral weight loss program.

Results: Mean body mass index at inclusion was 40 (range 35–49) kg/m², mean age 50 (range 33–65) years. After one year, 20 subjects had a mean (SD) excess weight loss of 54 (29) %, $p < 0.01$, and after two years 15 subjects had 61 (28) %, $p < 0.01$ (Figure 1). After one year BMI decreased from 40 (4) to 32 (5), $p < 0.01$, and quality of life, as measured with EQ-

5D, improved from 0.73 (0.27) to 0.88 (0.13), $p < 0.01$ (Figure 2). There were no serious adverse events or electrolyte disorders.

Conclusions: Aspiration therapy is an efficient and safe treatment for obesity, improving quality of life. Excess weight was approximately halved in a year, and the effect persisted for two years if treatment was continued.

RS3 – Novel drug targets for appetite and obesity

RS3.01

A neural basis for MC4 receptor-regulated appetite

Heisler, L. K.

Rowett Institute of Nutrition and Health, University of Aberdeen, UK

The identification of fundamental circuits modulating energy homeostasis and body weight will facilitate the development of effective obesity pharmacotherapies. Within the brain, the melanocortin system is a necessary point of convergence for multiple short- and long-term energy-related cues and has a fundamental role in regulating body weight. The endogenous melanocortin ligands are synthesized in discrete neuronal populations within the arcuate nucleus of the hypothalamus (ARC) and the nucleus of the solitary tract (NTS) and modulate homeostatic signalling via action at brain melanocortin-3 (MC3Rs) and -4 receptors (MC4Rs). The specific subpopulation of MC4Rs expressed within the paraventricular nucleus of the hypothalamus (PVH) has been demonstrated to potentially influence energy intake, whereas the subpopulation expressed with autonomic pre-ganglionic cholinergic neurons influence thermogenesis and glycaemia. We show that the neurotransmitter 5-hydroxytryptamine (5-HT; serotonin), specifically via action at the 5-HT_{2C} receptor, engages the melanocortin system to produce effects on food intake, glycaemia and body weight. Given its fundamental role in energy homeostasis and body weight, the melanocortin system has garnered much interest as a potential therapeutic target for human obesity.

RS3.02

Incretin conjugates

[No abstract]

RS3.03

Novel drug targets – lessons from bariatric surgery

[No abstract]

RS4 – Nutrition: From science to practice (with EFAD)

RS4.01

Computational modelling of energy balance

Hall, K.

National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK), National Institutes of Health (NIH), Bethesda, Maryland

Mathematical models of the dynamic relationships between energy intake, energy expenditure, and body composition change have resulted in new insights and practical tools for the investigation of obesity and its treatment. This presentation will illustrate how computational models of human energy balance can quantify the homeostatic control of human body weight, including the physiological adaptations of both energy expenditure and energy intake that act to resist weight loss interventions.

The role of body composition in nutritional assessment

Bosy-Westphal, A.

Germany

Although direct body composition analysis is still not a prerequisite for the diagnosis of nutrition and lifestyle related diseases it contributes to explain the underlying mechanisms of phenotypes like osteosarcopenic or metabolically healthy obesity. The spectrum of available methods for body composition analysis is large (from bioelectrical impedance analysis to whole body imaging) and the choice depends on target parameters as well as practical reasons and method inherent limitations of validity and precision. Body composition has the potential to innovate the diagnosis of obesity if old concepts based on fat mass (FM) are changed. It is now well known, that at the population level FM is not superior to BMI with respect to cardiometabolic risk prediction. This disappointing result raises doubts as to whether body composition really extends obesity diagnosis beyond BMI. The conundrum can however be solved if suitable parameters of body composition are chosen that are more meaningful for cardiometabolic disease risk when compared with the percentage of FM or fat mass index (FMI, kg/m²). Alternative concepts seek to create better health risk associated parameters by combining measures of “metabolic load” (fat mass) with measures of “metabolic capacity” (lean or fat-free mass, FFM), i.e. FM/FFM². FM and FFM are however chemically rather than anatomically defined components that only indirectly reflect more physiologic parameters like fat cell size, visceral or ectopic fat and skeletal muscle mass. Many factors could therefore limit their use. For example, assessing a low muscle mass on the basis of total FFM or regional lean massDXA could be misleading in the case of advanced age, severe obesity or weight reduced obese patients due to an increased contribution of connective tissue to lean mass (that can mask a decrease in muscle mass). In addition to a combination of more physiologic parameters of body composition (e.g. visceral fat and skeletal muscle mass) normalization for body size and confounders like age, sex and ethnicity is required for interpretation of body composition data. Multivariate regression analysis or mathematical modeling is therefore indispensable to compare individuals or heterogeneous samples. Of particular importance is the measurement of changes in body composition in order to evaluate therapeutic outcome. Because several determinants contribute to the partitioning of fat and lean mass during weight loss and weight gain, mathematical modeling of changes in body composition can as well help to normalize observed changes in body composition for predicted normal values. This concept is especially useful for evaluating the therapeutic outcome in individual patients as well as for comparing the results of small intervention groups that may differ with respect to these confounders. In conclusion, obesity should no longer be defined based on simple proxies of adiposity. Innovative concepts of body composition analysis that integrate the interaction between different fat and lean compartments can be validated according to cardiometabolic risk prediction and will thus extend our knowledge on the pathophysiology of energy partitioning.

Best practice in nutritional interventions – COMs expertise

[No abstract]

Thursday, 2 June, 2016

RS5 – New aspects on metabolic control

Neurobiology of reduced thermogenesis during dieting

Pandit, R.¹; Omrani, A.¹; Luijendijk, M.¹; Hoek, S.¹; Eggels, L.²; de Vrind, V.¹; Neijls, K.¹; Van Rozen, A.J.¹; la Fleur, S.E.²; Adan, R.¹

¹Brain Center Rudolf Magnus, Department of Translational Neuroscience, University Medical Center Utrecht, Utrecht, The Netherlands

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Weight loss in obesity is hampered by counter regulatory mechanisms such as reduced thermogenesis which can be reversed by injecting leptin peripherally. We discovered that restoring leptin signaling in the dorso-medial hypothalamic nucleus (DMH) is sufficient to normalize the reduced thermogenesis caused by withdrawal from an obesogenic diet. In support of this, inhibition of leptin signaling in the DMH reduces thermogenesis and promotes adiposity independent of food intake. Leptin's effect on thermogenesis involves DMH neuronal projections to hindbrain areas. When these neurons are depolarized by leptin or chemogenetically activated by CNO, core body temperature and brown adipose tissue thermogenesis increase. These studies collectively demonstrate that a state of relative leptin deficiency during dieting reduces leptin signaling in the DMH resulting in reduced thermogenesis and provides a mechanistic explanation for preservation of adiposity despite lowered caloric intake during dieting.

The role of non-neuronal cells in energy balance

Chowen, JA.

Hospital Infantil Universitario Niño Jesús, Instituto de Investigación Biomedica la Princesa, CIBEROBN, Madrid, Spain

Glia cells, the most abundant cell type in the central nervous system, participate in all aspects of brain function. However, it is only in recent years that the important functions of glia in the neuroendocrine control of metabolic homeostasis have begun to be elucidated. Approximately a decade ago, it was reported that high fat diet-induced hypothalamic inflammation and gliosis are implicated in the development of obesity associated secondary complications such as central insulin and leptin resistance. It is now known that, in addition to participating in pathophysiological processes, glial cells are also involved in the physiological control of metabolism. Glia, including astrocytes, tanycytes and microglia, express receptors and transporters for diverse metabolic signals. They are involved in the transport of nutrients and hormonal signals into the brain, thus determining the local environment of neurons. Glia also respond to metabolic signals. For example, leptin induces morphological changes in astrocytes that are associated with modifications in synaptic inputs to metabolic neuronal circuits. In addition, it modifies their capacity to transport glucose and glutamate, which would affect nutrient availability and neurotransmission. Indeed, loss of the leptin receptor specifically in astrocytes modifies the metabolic response to this hormone. Hypothalamic astrocytes also respond to ghrelin, which also affects their transport and metabolism of glucose and glutamate. In addition to hormonal signals, glial cells respond to nutritional signals, such as fatty acids. Moreover, their responses to saturated and unsaturated fatty acids differ. The aim of this talk will be to present our current understanding of how glial cells affect both physiological and pathophysiological metabolic control. Special emphasis will be placed on their responses to leptin, ghrelin and fatty acids.

The importance of sleep in metabolic disorders

Benedict, C.

Uppsala University, Sweden

Epidemiological studies have linked chronic short sleep duration (i.e. less than 7 hours per night) to weight gain and obesity in adults. Possible mechanisms through which short sleep duration tips the energy balance toward weight gain include higher blood levels of hunger-promoting metabolites (e.g., ghrelin, endocannabinoids), enhanced response of the sleep-deprived brain to hedonic food stimuli, increased food intake under both fasted and sated conditions, and reduced morning energy expenditure. In my talk, I will present an overview of recent research in this area, with emphasis on studies from my sleep laboratory. RS6 - Weight maintenance: is it achievable?

RS 6 – Weight maintenance: Is it achievable?

Body composition changes

Rodríguez, A.

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Overweight and obese individuals are at higher risk of developing cardiovascular diseases, type 2 diabetes and other health problems, with visceral obesity increasing the morbidity risk. Overwhelming evidence supports that the increased dysregulated adipose tissue is associated with obesity-associated cardiometabolic risk. The body mass index (BMI) is the most widely used clinical tool for the diagnosis of overweight (BMI 25–30 kg/m²) and obesity (BMI ≥ 30 kg/m²), but underestimates the prevalence of both conditions, clinically defined as an excess of body fat. In this sense, BMI classification misses subjects with increased cardiometabolic risk factors related to elevated adiposity. Other anthropometric measures such as the body composition analysis for determining body fat, waist circumference or the waist-to-hip ratio have been shown to better estimate the obesity-associated cardiovascular risk than BMI. Interestingly, NIH eligibility criteria for bariatric surgery, an effective strategy for achieving long-term weight loss in morbid obese patients, are based on BMI and the presence of major comorbidities (BMI ≥ 40 kg/m² or BMI ≥ 35 kg/m² + comorbidities). In this regard, obese individuals outside traditional NIH guidelines but with elevated adiposity exhibit an adverse cardiometabolic risk comparable to the eligible obese subjects, and these patients would benefit from the positive effects of a surgical approach. Taken together, the screening of overweight and obesity should focus on body composition, rather than BMI. The effect of weight-loss interventions on amount and distribution of adipose tissue and the effect of these adipose tissue changes on long-term outcomes, such as cardiovascular disease, hospitalizations and mortality, requires further research.

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European registry

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Many trials and reviews have well documented the impact of lifestyle intervention (diet, exercise, behavior change or combination) in weight loss. It has also been well documented that weight regain is the most common long term outcome and weight maintenance cannot always be achieved. It has been suggested that this is due to behavioral fatigue since many stud-

ies have shown that diet and exercise regimens appear to yield little benefit after the first 6 months. Measures for improving the weight maintenance have been proposed such as counseling sessions, longer intervention, individualized diets, new technology to monitor weight, frequent feedback and maybe economic incentives. In Europe a number of research projects are looking at the multiple factors that impair long term weight maintenance and how to target individuals or specific populations with evidence based strategies. In Diogenes study, it has been shown that a diet that was moderately high in protein content and slightly reduced in glycemic index improved the rate of completion of the intervention and maintenance of weight loss and therefore appears to be ideal for the prevention of weight regain. Furthermore, most studies have shown that physical activity has a major role in the amount of weight regained after the initial weight loss. Two systematic reviews concluded that weight regain is reduced if the individuals are engaged in physical activity. Developing more in depth understanding of how external factors (e.g. social, cultural, and environmental) influence individual eating and physical activity patterns are critical to developing an intervention that works and leads to weight loss maintenance (WLM). A new EU project (SPOTLIGHT) aims to define the factors necessary for establishing effective health promotion approaches, taking into account individual, family, organizational, and environments factors that can change behavior, lifestyles, and life skills to sustainably reduce obesogenic behaviors in an innovative way. The NoHoW project looks at which techniques work best for WLM. The NoHoW team is working on strategies and predictors for WLM and on how to develop really effective programs for WLM. The Toolkit that will be developed will include a set of mobile apps, web-based tools and inputs from other technologies, such as smart scales and activity trackers. There are also programs developed in specific European countries like NULevel project that has created a new, scientific program to help people avoid weight regain and is tested with people who live or work in the North East of England. Taking into account the experience in Europe, the Nutrition Working Group (NWG) of EASO is working to develop European dietary Guidelines for Obesity aiming also at WLM. In conclusion, we are looking forward to the results of the ongoing EU projects but also further studies are needed to take place in Europe in order to examine the multiple factors that contribute to the phenomenon. There is need for more well planned interventions with long term follow up that combine behavioral treatment with lifestyle intervention to achieve a successful weight loss and maintenance and to improve health of the obese population.

What distinguishes weight loss maintenance from the general population?

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Successful weight loss maintenance has been shown to be associated with healthy eating behavior such as eating a low-calorie, low-fat diet, eating breakfast regularly, self-monitoring weight, and maintaining a consistent eating pattern across weekdays and weekends. Low levels of depression and disinhibited eating, and low levels of binge eating were also associated with long-term weight loss maintenance. However, successful weight loss maintainers (WLM) have mostly been compared with treatment-seeking obese subjects or weight regainers. Self-identified weight loss maintainers from the German Weight Control Registry (GWCR, n = 494) were compared with a representative sample of the general German population (n = 2 129). The samples did not differ in age. This is the first study to directly compare self-identified WLM with a representative sample of the general population using the same assessment instruments in both cohorts. The GWCR participants reported more self-weighing and higher eating frequency but less hot meal consumption and more eating-out-of-home. Binge eating, compensatory behaviors, and concerns about shape and weight were reported more often by successful weight loss maintainers. Scores of depression and worrying about health were slightly higher

whereas severity of somatic symptoms was less pronounced in the GWCR participants. Overall, successful WLM reported greater binge eating frequency and placed more emphasis on shape and weight compared to the general population. In addition, WLM reported a higher prevalence of compensatory behaviors suggesting that in a subgroup of individuals weight loss maintenance might be achieved also by non-normative behaviors which might increase the vulnerability for weight regain. Weight loss and weight maintenance treatment approaches might benefit from this information.

RS6.04

Predictors of weight loss maintenance

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Predictors of weight loss maintenance (WLM) can be either physiological or psychological characteristics of subjects, processes of behaviour change or other intervention components with which participants engage during attempted weight loss (WL) and WLM. Predictors and correlates of outcomes are not always static, but often vary and can change between phases of WL and attempted WLM. In many models of WL and WLM: (i) predictors explain relatively little (~ 20–30% of the variance in longer-term weight outcomes, and so most variance is unexplained; (ii) many predictors are the sum of several small constituent variables, each accounting for a small proportion of the variance; (iii) inter-individual variability in predictors and correlates of outcomes is high. In broad behavioural terms dietary changes in behaviour appear to be associated with initial WL, while physical activity is strongly associated with WLM. WL induces changes in physiological and emotional systems, which can increase the probability of weight relapse. It is currently unclear how rate, extent or specific WL approaches predict subsequent WLM. There is now good evidence that behaviour change techniques associated with self-regulation of activity and eating behaviour (e.g. goal setting, action plans, self monitoring, relapse prevention plans) and aspects of motivation are important for WLM. There may be differing clusters of behaviours, which characterise WL compared to WLM and relapse. Evidence that stress management and emotion regulation may be important for relapse prevention is strongly suggestive but less concrete. Greater standardisation of predictive constructs and outcome measures, in more clearly defined study populations, tracked longitudinally would improve prediction of who is likely to maintain weight loss or relapse. Modelling within and between-subject patterns of variability in behaviour, and identifying effective mediators of both sustained behaviour change and relapse are central to understanding and improving longer-term WLM.

RS7 – Childhood obesity across Europe

RS7.01

A clinical insight

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Obesity in childhood is a burden for all European societies. Obese children suffers from many comorbidities, are at high risk to be obese as adults, and the quality of life of obese children is reduced due to blaming of their peer groups as well of the entire society. Accordingly, obese adolescents have problems to get adequate jobs and education. The obesity rates in childhood are threefold higher in South and Eastern Europe compared to Central and North Europe (for example obesity rate in Germany 6%) and higher in children with migration **background** and or low social status. The underlying mechanisms have not been completely understood so far. The views on childhood obesity as well as the diagnostic and treat-

ment procedures have changed dramatically in last 20 years. We now have international accepted cut-off values for BMI to define overweight and obesity. Today, it is clear that obesity in childhood is a disease which is associated with increased morbidity and mortality. Diseases previously known only from adults now appear in obese children and adolescents such as polycystic ovarian syndrome (PCOS), sleep- apnea syndrome, fatty liver disease or type 2 diabetes mellitus. Childhood obesity is regarded as a genetic disorder unmasking based on changes of environment. However, genetic research has help us to understand the satiety regulation but failed yet to achieve effective or target-specific prevention or treatment strategies. Furthermore, so far no effective drugs for weight reduction are on the market for children and adolescents, while some promising drugs such as glucagon like peptide agonists are in the pipeline or just approved for adults. Lifestyle intervention has been suggested as the approach of choice for prevention and treatment of childhood obesity in the past. Today we know that -while lifestyle intervention is effective in treatment of obesity if families are involved and motivated- this approach has failed as prevention strategy as demonstrated by several RCTs. Changes of life circumstances seems more promising for prevention. The obesity prevalences rates are stable in Europe in the last 5 years, while the prevalences of childhood obesity increased 1% per year in the years before since 1990. The reasons for this stabilization are not clear but the awareness of obesity in Europe in media may have support this development. However, degree of overweight is still increasing leading to a new problem, the extremely obese adolescents. These extremely obese adolescents do not respond to lifestyle intervention. Therefore, new treatment strategies such as bariatric surgery for adolescents has been development, while we still have no clear indication or knowledge which extremely obese adolescents will profit in the long-run of this invasive treatment approach.

RS7.02

Healthy nutrition: What do we know and recommend?

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The pathogenesis of a number of diseases, including obesity, has been linked, among other factors, to early nutrition. The aim is to summarise recent evidence on early nutritional interventions, i.e., breastfeeding, timing of the introduction of complementary feeding, and alterations in the protein content in infant formulas, that potentially may modify the risk of developing obesity later in life. MEDLINE was searched in January 2016. Preference was given to evidence and recommendations from scientific societies published in the last 5 years. Current evidence does not allow a firm conclusion to be drawn regarding which nutritional intervention might constitute a potentially important approach to reducing the risk of childhood overweight and obesity. Evidence is conflicting as to whether breastfeeding reduces the risk of obesity. Despite the controversy, even if breastfeeding does not provide a strong protective effect against obesity, there is a consensus that exclusive breastfeeding for 6 months (or for at least 4 months), as well as continuation of breastfeeding in conjunction with consumption of complementary foods for 1 year or more, should be promoted. Complementary feeding should not be introduced in any infant before 17 weeks, and all infants should start complementary feeding by 26 weeks. Protein content in infant formulas may influence weight gain. However, further trials are needed to determine the protein intake that will ensure optimal child growth.

RS7.03

New trends in sedentary activity among European children.

[No abstract]

RS7.04

Self-esteem and social acceptance at school

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Clinicians and researchers have long noted important associations between social relationships and health, with less socially integrated individuals generally demonstrating poorer physical/mental health and increased mortality. More recent scientific work has focused on advancing theory and elucidating mechanisms in potentially bi-directional causal pathways between social factors and health behaviors/outcomes. The obese children often suffer from stigmatization, rejection and discrimination (Nowicka et al, 2009). Their classmates are the authors of most of these malicious remarks and school is the environment where most of these experiences occurred, often resulting in lower self-esteem and lower social acceptance (Puhl et al., 2007). Self-esteem in early adolescence is linked to social relationships through feelings of peer support, and self-perception of one's place in peer groups and social status hierarchies. Self-esteem is considered to be an important indicator of personal resilience, defined as adaptability in the face of adversity, risk exposure, or disadvantage (Fergus and Zimmerman, 2005). Adolescents who are overweight/obese, but particularly those who perceive themselves as such, are more likely to engage in risk behaviors than those who are, or perceive, themselves of normal-weight. Weight stigma and discrimination may contribute to this association as they reinforce poor body image and create intense stress (Farhat, 2015). During early adolescents (9–12 yrs) hormonal transformations accompany a reorientation of motivation, decision-making, and risk-taking behaviors (Dahl, 2004), and children are increasingly responsive to peer interaction and social influence (Forbes and Dahl, 2010). Additional attention to peer dynamics is warranted due to a growing body of evidence connecting social relationships with social cognitive development (Hostinar, 2015). This presentation will review recent findings concerning the psychological and neurobiological mechanisms of action for social support, the developmental patterning of social stress-buffering and discuss future implications.

RS8 – Microbiome

RS8.01

Does the gut microbiota mediate the positive metabolic effects following Bariatric surgery

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The human gut is inhabited with trillions of bacteria, gut microbiota, that have co-evolved with us and affect our physiology within and outside the gut. The gut microbiota has recently been suggested as a novel contributor to obesity and related comorbidities, such as type 2 diabetes (T2D) and cardiovascular diseases (CVD). We have demonstrated that the gut microbiota is altered in patients with CVD and T2D. Bariatric surgery is the only treatment for obesity with long lasting effects that also improves glucose metabolism and reduces CVD. We recently found that Roux-en-Y (RYGB) gastric bypass alters the gut microbiota and their genes, which to some extent may reflect an altered nutritional environment. Importantly, transfer of fecal samples to germ-free mice demonstrated that some of the beneficial effects of RYGB may be explained by the altered microbiota. RYGB also altered bile acid metabolism and that the beneficial effects observed after bariatric surgery are mediated by functional FXR signalling. FXR is a nuclear bile acid receptor that modulate several aspects of host physiology. Taken together bariatric surgery may exert some of their beneficial effects through altering gut microbiota and bile acid metabolism.

RS8.02

How does surgery impact on the human microbiota

Clément, K.

France

The intestinal microbiota is now understood to exist as a complete organ in itself, and which acts as a link between environmental (external) factors and their effects on organism biology. The gut microbiota provides essential functions throughout life, such that an imbalance, or dysbiosis, has been demonstrated in various human diseases, whether metabolic, cardiovascular, or immuno-inflammatory. These metagenomic observations are in part due to the recent development of tools capable of sequencing millions of bacterial genes in the gut microbiome. One factor which is common to many human disorders is a loss of bacterial richness. Recently, our team contributed data demonstrating that obese people with reduced bacterial richness have increased cardiometabolic risk factors (insulin resistance, dyslipidemia, low-grade inflammation). Additional data from our team has shown that this loss of bacterial richness is amplified in severely obese subjects who are candidates for bariatric surgery. We have identified relationships between certain bacterial groups and specific metabolic traits. These factors, along with richness, can change during the kinetics of weight loss induced by bariatric surgery. Moreover differential improvements in gut microbial richness appear to depend on bariatric surgery procedures. It remains to be determined whether these microbial changes can explain the observed improvements in low-grade inflammation and other metabolic markers after bariatric surgery in humans. This presentation will review the recent discoveries in the field of bariatric surgery and gut microbiome changes, and discuss whether the gut microbiome is important in understanding or predicting clinical outcomes after bariatric surgery.

RS8.03

Fecal transplantation as a metabolic treatment in humans

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Internist-endocrinologist AMC and VUmc

Alterations in (small) intestinal microbiota are associated with obesity and insulin resistance, with the latter usually characterized by low grade endotoxemia and altered short chain fatty acid (SCFA) production. We showed that fecal transplantation (infusing intestinal microbiota from lean donors) in male recipients with metabolic syndrome has beneficial effects on the recipients' microbiota composition and glucose metabolism via increasing SCFA producing bacterial strains in the gut (Vrieze, Gastroenterology 2012). Followup studies reproduced that single fecal transplant has beneficial short term but no longterm effect on insulin sensitivity in metabolic syndrome subjects (Kootte et al, manuscript in preparation). Moreover, we found that the short term beneficial effect of lean donor fecal transplantation is mainly driven by acceptor (host) dependent criteria including remaining insulin sensitivity at baseline. Interestingly, we subsequently found that 4 weeks oral supplementation with the SCFA butyrate is also host dependent as we only found a beneficial effect on insulin sensitivity in lean males, but no effect in obese metabolic syndrome subjects. Combined our data suggest that supplementation with SCFA has different effects than supplementing with specific intestinal SCFA bacterial strains and that the latter might thus be developed as therapeutic targets to improve insulin sensitivity in obese humans.

RS11 – Fiscal measures: Taxes, subsidies, incentives

RS11.01

The Danish story

Jensen, J.

Denmark

As the first country in the world, Denmark introduced a tax on saturated fat in 2011 - however the tax was repealed again in 2012 after 15 months in action. This presentation gives an overview of the Danish fat tax: its design, its effects, and the debates and political processes surrounding its introduction and withdrawal. The tax targeted foods aimed for domestic consumption with saturated fat content above 2.3 g/100 g. These foods were taxed at a rate proportional to the saturated fat content (16 DKK/kg ~ 2.15 €/kg saturated fat). Various empirical studies have assessed the tax' effects on the consumption of fats and oils, cream products and meat products, as well as the overall diet quality and potential health promoting effects. In general, these studies suggest that the tax had statistically significant (although moderate) effects in terms of substitution from high-fat to lower-fat product varieties and reduced intake of saturated fat from the considered product categories. Many influential actors in the public debate, including representatives from the food industry and nutrition researchers, expressed concerns regarding the tax' potential harmful effects on the economy and regarding the tax' influence on health, and few policy actors defended the tax. Public health played a prominent role in the politicians' arguments for introducing the tax, but was hardly mentioned in the debate about the repeal.

RS11.02

Frence Soda Tax

Allais, O.

France

In almost every developed countries, obesity rates have significantly increased over the last decades. This trend is mainly explained by change in prices favoring an increase in caloric intake and a decrease in cost of using calories. Several food fiscal policies has been implemented to discourage (stimulate) unhealthy (healthy) product purchases. In particular, French government implemented a tax on all non-alcoholic beverages with added sugar or sweetener, and notably sodas, fruit drinks and flavored waters since January 1st, 2012. The tax was set to 11 euro cents for a 1.5 liter of soda , i.e. about 6% of the average price of sodas. What are the effects of the French soda tax ? Studies show weak effects on soda purchases, and added-sugar consumed but interestingly they suggest that the tax is overshifted to consumer prices for most taxed beverages, and generates substantial tax revenue.

RS11.03

Incentivising health in the workplace

[No abstract]

RS11.04

The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school based interventions

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Ethical concern around governments controlling individual choice reduces political action to implement restrictive policies for obesity. This research builds on the concept recently proposed by Griffith & West (1) to investigate the influence of enhancing or diminishing autonomy on effectiveness of interventions. We conducted a review of 56 school-based RCTs for obesity prevention. Interventions were sub-grouped according to their influence on autonomy, and their effect on weight status explored. A meta-analysis demonstrated an association between autonomy and effect size. Of interventions targeting dietary and physical activity behaviours, those which slightly increased or slightly reduced autonomy produced a similar effect size (Mean difference [CI] BMI; -0.19[-0.33;-0.04], -0.20[-0.80; 0.40]). Those which diminished or enhanced autonomy to the greatest extent were more effective (-0.35[-0.61;-0.09], -0.50[-1.48; 0.48]). This suggests that regardless of whether we positively or negatively influence autonomy, the interventions that are the extremes are the most effective. Where many potential options exist, a framework for categorising obesity prevention interventions by their influence on autonomy may be beneficial to prioritise effective strategies for policy makers.

RS11.05

Exploring Malta's food and build environment

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Background: The global rise in childhood obesity prevalence has increased interest in the neighbourhood retail food environment as a factor likely to be influential in determining population dietary behaviour and weight outcomes. Living in environments where healthy food is not readily available has been found to be associated with increased risk of being overweight or obese, whereas access to healthy food may be protective. Little is known about the community food environment in Malta. Aim: The aim of this study was to assess the features of the built environment, the community food environment, and consumer food environment in representative localities across the Maltese islands.

Methods: A representative, socio-economically diverse sample of ten localities was selected. A field audit covering areas of approximately 0.5km² in each locality was carried out using validated tools. An in-depth review of the consumer food environment was also carried out in three grocery stores of differing size within each audited locality (n = 30) using the NEMS-S instrument. **Results:** Bus stop density was higher (+11/km², p = 0.037) and pavement quality was better (+0.73/km², p = 0.042) in localities having highest SES compared to lowest SES, whereas density of confectionery stores (-31.5/km², p = 0.041) and bars (-6.50/km², p = 0.022) was significantly lower. Overall, larger grocery stores offered a significantly more healthful environment, having greater availability (varieties and shelf space allocation) of healthier items, and at cheaper prices than small grocery stores. Significant differences were found between the median prices (per kg/L) of healthy and regular versions of certain foods. Sugared cereal and sweetened juice drinks were significantly more expensive than their unsweetened counterparts, whereas white pasta and regular beef mince were cheaper than their wholemeal and lean counterparts respectively.

Conclusion: This is the first systematic documentation of the retail food environment that has been carried out in Malta, and serves to highlight attributes that may influence dietary behaviours in the Maltese population. Study findings may be useful to guide multi-level environmental interventions strategies aimed at improving the food environment as a potentially effective strategy to address the rising trend in childhood obesity.

RS13 – Interorgan crosstalk

RS13.01

Between the gut and white adipose tissue

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Growing evidence implicates the bacteria present in our gut in the effect of genetics and lifestyle on obesity and metabolic diseases. Most of the current literature on gut bacteria consists of cross-sectional and correlative studies, rendering it difficult to make any causal inferences as to the influence of gut bacteria on obesity and related metabolic disorders. Interventions with germ-free animals, treatment with antibiotic agents, and bacterial transfer experiments have provided some evidence that disturbances in gut bacteria may causally contribute to obesity-related insulin resistance and adipose tissue inflammation. Several potential mediators have been hypothesized to link the activity and composition of gut bacteria to insulin resistance and adipose tissue function, including lipopolysaccharide, Angiopoietin-like protein 4, bile acids, and short-chain fatty acids. In this presentation I will critically evaluate the current evidence related to the direct role of gut bacteria in obesity-related metabolic perturbations, with a focus on insulin resistance and adipose tissue inflammation. It is concluded that the knowledge base in support of a role for the gut microbiota in adipose tissue function needs to be strengthened.

RS13.02

Between the gut and the brain

[No abstract]

RS13.03

Between the gut and the liver

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Bile acids (BA) exert important functions in the entero-hepatic system. BA are synthesized and conjugated in the liver, secreted in the duodenum after meal ingestion, modified by the intestinal gut flora, reabsorbed in the intestine and transported back to the liver by the portal vein. Although most BA are recaptured by hepatocytes, a fraction escapes and reaches peripheral organs. BA pool size and composition are modulated by metabolic perturbations, being altered in obesity, insulin-resistance, type 2 diabetes and non-alcoholic steatohepatitis (NASH) in preclinical models and humans. BA sequestrants, which interrupt the entero-hepatic BA circulation, improve lipid/glucose homeostasis. Modification of the intestinal microbiota also alters the BA pool in mice. Systemic BA concentrations increase after Roux-en-Y-gastric-bypass (RYGB) surgery in humans and animal models. The mechanisms underlying most of these changes and their reciprocal interaction with metabolism are still unclear. BA modulate metabolism in part through activation of the nuclear receptor Farnesoid X Receptor (FXR) and the membrane receptor TGR5. BA and FXR regulate metabolism via entero-hepatic signalling. FXR protects the liver from BA overflow by regulating BA synthesis, secretion and transport. In the intestine, BA bind to FXR in ileal enterocytes to induce FGF15/19 expression which in turn inhibits hepatic BA synthesis. In the liver, FXR also regulates glucose and lipid metabolism. Moreover, FXR signalling contributes to the changes in gut microbial communities and the metabolic benefits of vertical sleeve gastrectomy. Furthermore, microbiota-modified BA not only act in the gut, but also on the entero-hepatic system to control hepatic BA metabolism and obesity. Intestinal FXR signalling also modulates NASH. We recently reported FXR expression in the entero-endocrine tissue, specifically in entero-endocrine L cells, where FXR inhibits

the response to glucose on the production and secretion of the incretin GLP-1. These studies established the importance of BA signalling through FXR in the intestine and the potential of FXR antagonism in the treatment of metabolic diseases.

RS14 – Obesity and cancer

RS14.01

Epidemiology and cancer

[No abstract]

RS14.02

Molecular targeting of obesity pathways in cancer

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Over the past several years, the field of cancer research has directed increased interest towards obesity-associated cancer, steering to the American Society of Clinical Oncology position statement on obesity and cancer in 2014. Cancer is a complex multi-factorial disease, characterized by decades of intricate genetic and environmental interactions that ultimately lead to disease initiation, promotion, and progression. The environment surrounding the tumor plays a role in this disease, where a wide variety of molecular and cellular pathways are involved. Thereby, identifying molecular targets disclosed during obesity status is key to understanding the appropriate preventive and therapeutic measures in obesity-associated cancer. White adipose tissue, which influences cancer cells growth, metastasis and recurrence, is an integral part of the tumour microenvironment. The obese setting provides a unique microenvironment in adipose tissue with concomitant paracrine and endocrine alterations that favour both tumour initiation and progression. A series of basic and translational research studies uncovered the uniqueness of the previously unrecognized influence of localized fat depots in cancer aggressiveness, besides the well-established influence of adipokines. During obesity the altered concentration, at tissue and serum level, of adipokines result in the activation of multiple signalling pathways in tumor cells, including PI3K/Akt, MAPK and STAT3 pathways. These pathways contribute importantly to cancer initiation and progression and can all converge downstream on mTOR. Alternatively, adipokines may contribute to chemokine-mediated activation of tumor cells favouring extended local dissemination and aggressiveness. Moreover, obesity-related chronic low-grade inflammation, recruitment of adipose stromal/stem cells to the tumor site, adipocyte-derived exosomes and microRNAs and epigenetic changes, are all plausible links between obesity and cancer. Taken together, evidence now supports that specific therapeutic agents designed for patients with obesity who develop tumors are needed. Therefore, our ability to treat cancer in obese patients will be dependable of effective drugs targeting the molecular pathways that link obesity to cancer. Notably, supplementing the standard of care treatments in cancer patients with metformin has been shown to improve both biological and clinical outcomes, particularly through its inducible effect in AMPK. In addition, given the role of inflammation in obesity-promoted malignancy, a rationale exists for evaluating anti-inflammatory therapeutics. Importantly, due to multiple factors and signalling pathways that are activated in obesity-associated cancer, inhibition of a single molecule may not be enough. In an increasingly obese population, recognizing the molecular landscape of the mechanistic association between adipose tissue and cancer may provide an opportunity for preventive and therapeutic strategies to reduce incidence, morbidity and mortality.

Obesity is a new major cause of cancer*Renehan, A.*

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A large volume of epidemiology demonstrates associations between increased body mass index (BMI), as an approximation of general adiposity, and increased incident risk for many common adult cancer types – associations that are sex-, site- and histological type-specific. There are ten ‘obesity-related’ cancers: post-menopausal breast, endometrial, ovarian, advanced prostate, colorectal, kidney, pancreatic, liver, gallbladder, and oesophageal adenocarcinoma. Given the plausibility of the biological explanations, the consistency and specificity of associations, the sufficiently long latency times between BMI measurement and cancer occurrence, and the demonstration of risk reversibility in morbidly obese cohorts undergoing bariatric surgery, these associations are probably causal. This is a key assumption on which one can estimate the global burden of cancer attributed to high BMI. This analysis was undertaken for 2012 (Arnold et al. *Lancet Oncology* Nov 26, 2014). Other specific assumptions and methodological issues underpinning these analysis will be detailed in the seminar. The analysis showed that worldwide almost a half-million (or Population Attributable Fraction, PAF = 3.6%) of all new cancers are attributed to excess BMI. This ranks excess weight as the third highest risk factor attributing to the global cancer burden after smoking (21%) and infections (16%). PAFs were greater in women than in men (5.4% vs 1.9%). The burden of attributable cases was higher in countries with very high and high human development indices (HDIs; PAF 5.3% and 4.8%, respectively) than in those with moderate (1.6%) and low HDIs (1.0%). Collectively, endometrial, postmenopausal breast, and colon cancers accounted for almost two-thirds of cancers attributable to high BMI. Compared with 1982, a quarter of the cancer cases related to high BMI in 2012 could be attributed to the temporal increase in BMI – in other words, obesity has become a new major cause of cancer, an attribution likely to increase further in the coming decades.

Friday, 3 June, 2016**RS16 – Ectopic fat**

RS16.01

Perivascular fat and its role in cardiovascular disease*Dyck, J.*

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Although advancements in therapies to treat cardiovascular disease have reduced cardiac-related mortality, these treatments/interventions have ultimately also increased the incidence and prevalence of heart failure. Of interest, heart failure induces systemic and cardiac insulin resistance and there is evidence that this negatively influences health outcomes in heart failure patients. Importantly, studies in mice and humans have demonstrated that heart failure induces white adipose tissue inflammation, and that this inflammation directly contributes to systemic (and possibly cardiac) insulin resistance. The investigation into how heart failure-induced adipose tissue inflammation contributes to insulin resistance and worsening of heart failure will be the topic of this presentation.

RS16.02

Novel aspects on the link between liver fat accumulation and hepatic or whole body insulin resistance*Hofker, M.*

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Inflammation and lipid accumulation in the liver are believed to be the main drivers of hepatic insulin resistance in NAFLD. However, the cause – effect mechanisms are difficult to understand especially since obesity cannot be ignored as an underlying factor in this relationship. In contrast to current beliefs, a mechanism is emerging where the liver fat accumulation and hepatic insulin resistance are consequences of obesity, rather than an initiating factor. For instance, we have shown that hepatic fat accumulation does not lead to changes in insulin sensitivity. Moreover, in non-obese mouse models for non-alcoholic steatohepatitis, we do not find a link between inflammation and hepatic insulin resistance. In addition, it has been demonstrated that systemic insulin resistance causes hepatic lipid accumulation. This includes the observation, that during diet-induced obesity, mice first gain weight and show adipose tissue inflammation, before displaying hepatic fat accumulation. While the dietary fat itself may be a disease-causing factor, evidence is now accumulating to support a role for the gut and the gut microbiome in the development of metabolic disease. Several mechanisms have been postulated and include dietary effects on gut microbiota composition, gut-permeability and mucosal immunity. As the gut-microbiota is modifiable, it thus presents itself as an excellent target for prevention and therapy to dampen insulin resistance and NAFLD.

RS16.03

The ELF score is associated with 1H-MRS measured liver fat content in Danish children with overweight and obesity

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Non-alcoholic fatty liver disease (NAFLD) is prevalent in childhood obesity and has now become the most frequent cause of chronic liver disease in children in industrialised nations. Paediatric NAFLD can lead to hepatic fibrosis and progress to hepatic cirrhosis requiring liver transplantation in some cases. The enhanced liver fibrosis (ELF) score has been validated for staging liver fibrosis primarily in adult patients. Recently, however, the ELF score was shown to predict liver fibrosis in children, with an even higher degree of sensitivity and specificity than in adults.

Objectives: To investigate the association between the ELF score and liver fat content (LFC) in Danish children and adolescents with vs. without overweight/obesity.

Material & methods: In 324 Danish children and adolescents, the LFC was measured by proton magnetic resonance spectroscopy and the fasting serum concentrations of hyaluronic acid (HA), amino-terminal propeptide of type III procollagen (P3NP), and tissue inhibitor of metalloproteinase 1 (TIMP-1) were used to calculate the ELF score using the equation: $2.278 + 0.851 \cdot \ln(\text{CHA}) + 0.751 \cdot \ln(\text{CP3NP}) + 0.394 \cdot \ln(\text{CTIMP1})$.

Results: In the 265 participants with overweight/obesity, a multivariate linear regression model showed that the ELF score associated positively with LFC ($p = 0.019$) and sex (boys had a higher ELF score, $p = 0.0009$) and inversely with age ($p < 0.0001$), independently of BMI SDS ($p = 0.79$). No difference was observed in the median ELF score for lean children/adolescents (8.5 [range: 6.7–10.1]) vs children and adolescents with overweight/obesity (8.6 [6.4–10.5], $p = 0.34$).

Conclusion: This study demonstrates that the enhanced liver fibrosis score is associated with the accumulation of fat in the liver independent of the degree of obesity in Danish children and adolescents with overweight/obesity. Further, this study showed that the ELF score is higher in boys and lower with greater age. These important biological findings may broaden the range of usability of the ELF score in the clinical treatment of childhood obesity.

RS16.04

Impaired skeletal muscle fatty acid handling in overweight and obese insulin resistant humans

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Background and Aims: Disturbances in skeletal muscle fatty acid (FA) handling might play an important role in the development of whole-body insulin resistance (IR). In this study, we investigated fasting and postprandial skeletal muscle FA handling in overweight and obese IR humans. **Methods:** 74 overweight and obese participants (62 men and 12 women) were included and divided in two groups based on the median of HO-MA-IR (3.35). Fasting and postprandial skeletal muscle FA handling were determined by combining the forearm muscle balance technique with stable isotopes. [²H₂]-palmitate was infused intravenously, labeling very-low density lipoprotein triacylglycerol (VLDL-TAG) and free FA (FFA) in the circulation, whereas [U-¹³C]-palmitate was incorporated in a high-saturated fat mixed-meal, labeling chylomicron-TAG. Skeletal muscle biopsies were taken to assess intramuscular lipid content, the degree of saturation and their fractional synthetic rate (FSR).

Results: In the postprandial phase, forearm muscle VLDL-TAG extraction was significantly higher in the high IR group as compared to the

mild IR group (AUC_{0–4h}: 0.57 ± 0.32 vs. -0.43 ± 0.38 nmol·100 ml tissue⁻¹·min⁻¹; $P = 0.045$, respectively). There were no differences in the TAG, diacylglycerol (DAG) and FFA intramuscular content and FSR. In the high IR group, the saturation was significantly higher in the intramuscular FFA pool ($P = 0.039$). This was mainly explained by higher percentages of myristic acid ($P = 0.078$), pentadecylic acid ($P = 0.038$) and tricosylic acid ($P = 0.064$). Furthermore, a higher percentage monounsaturated FA ($P = 0.052$) and lower percentage polyunsaturated FA ($P = 0.022$) was observed in the intramuscular DAG pool in the high IR group. Multiple regression indicated that these results were independent of age, waist-hip ratio and BMI.

Conclusions: An increased skeletal muscle VLDL-TAG extraction in the postprandial state, a higher saturation of intramuscular FFA pool and a shift of saturation in the intramuscular DAG pool are associated with insulin resistance. These data suggest that a disturbed skeletal muscle FA handling could play a role in the development of whole-body IR.

RS17 – Appetite and pleasures

RS17.01

Neural profiling in obesity – linking brain responses to weight status and outcomes

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Functional neuroimaging techniques, in particular functional MRI (fMRI) have been used to study differences in brain function between normal-weight and obese individuals. While this has improved our understanding of the hedonic and homeostatic brain areas and processes affected in obesity, there is much to be gained, still. First, the vast majority of these studies are posthoc and cannot tell us what is cause or effect. Second, most studies compare average responses between groups selected on BMI cut-offs, which is a good first step but fails to address the large within-group variability in brain responses and other outcomes. Third, understanding of the neural processes altered in obesity is crucial for improving prevention and treatment, however, brain measures need to be linked to relevant outcomes like actual eating behaviour and weight change. I will review recent work on what may be called 'neural profiling', i.e., the identification of neural markers predictive of eating behaviour and weight (change). This involves characterization of groups and individuals based on their brain responses to food, satiety and reward, and linking of neural response profiles to (subsequent) changes in BMI or other relevant outcomes like weight loss success. On the longer term, this may allow us to classify individuals into different obesity subtypes and adjust treatment accordingly.

Acknowledgement: I gratefully acknowledge support by the European Union Seventh Framework Programme (FP7/2007–2013) under Grant Agreements 266408 (Full4Health), 266044 (I.Family) and 607310 (Nudge-It).

RS17.02

Eating for pleasure

[No abstract]

RS17.03

Neurology of hedonic eating Hedonics act in unison with the homeostatic system to unconsciously control body weight

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With the global obesity crisis continuing to take its toll, the demand for solutions has increased. The discussion about nature vs. nurture and biology vs. psychology has culminated in declaring obesity as a disease by some medical organizations. Environmental factors and genetic predisposition, rather than personal responsibility are to blame, as for any other disease. This view implies that the biological processes regulating body weight are essentially operating at the unconscious realm. While this has long been accepted for the so-called homeostatic regulation of energy balance, it is less clear for the hedonic controls. I will critically evaluate the important question how rodent models can help understand the contribution of hedonic neural processes to body weight regulation. When looking at the concepts of reward, reinforcement, motivation, pleasure addiction and their neural mechanisms, in the context of eating and exercise, the new view emerges that homeostatic and hedonic controls are closely inter-related and often act in unison at the unconscious level to achieve biologically adaptive responses. While the discussion of a body weight set point has been neglected in recent years, this topic becomes more pressing as an important aspect for effective treatment of obesity.

RS18 – How to address social inequalities in childhood obesity

RS18.01

Is it possible to level out social inequalities in childhood obesity by policies and interventions?

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Many diseases, including childhood obesity, are strongly patterned by social factors such as parental educational level, income and occupation. Strong negative associations in childhood obesity have consistently been reported from developed countries, while positive associations have been found in developing countries where the poorest parts of population is undernourished or eating a traditional diet in contrast to the more well-off parts of the population with sufficient resources to consume a westernized diet and to have more sedentary habits. Eating habits and physical activity patterns are strongly associated with childhood obesity as well as with social factors. Unsurprisingly parents' and children's eating habits and physical activity patterns are also strongly linked. Can social inequalities in these health behaviors and in childhood obesity be ameliorated by policies at the society level or the health care system by adapted intervention programs? We will discuss evidence on structural factors and policies at the society level with potential to levelling out social inequalities in childhood obesity and associated behaviors. We will also consider how design and implementation of prevention programs may result in better intervention effects among well-educated compared to low-educated parents and their children. Related concept of importance, such as health literacy, will also be considered.

RS18.02

Global patterns of inequality and childhood obesity

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Patterns of adult obesity vary according to socio-economic status and levels of inequality both across and within nations, varying also according to the extent of social security between nations. It is not clear the extent to which such patterns are mirrored for childhood obesity. This analysis examines this possibility. It uses data averaged for the period 2005 to 2015 on childhood obesity and adult obesity for 59 nations from the World Federation of Obesity database, with World Bank data on gross domestic product (GDP), economic inequality across nations, government expenditure as proportion of GDP (as a measure of social security), and Food and Agriculture Organisation data on national dietary energy availability. Ordinary least squares regression analyses show obesity among female children to be positively related to obesity rates among adult males ($P < 0.001$) and inequality ($p < 0.05$) (model r^2 0.28, $p < 0.001$). Obesity among male children it is also positively related to obesity rates among adult males ($P < 0.001$) and inequality ($p < 0.05$) (model r^2 0.28, $p < 0.001$), but also weakly positively associated with dietary energy availability ($p = 0.08$) and negatively associated with GDP ($P = 0.08$) (model r^2 0.40, $p < 0.001$). All models tested excluded social security as non-significant in associations with childhood obesity. Patterns of childhood obesity vary according to economic inequality within nation for both males and females, as well as very weakly negatively by GDP for males. Inequality in childhood obesity mirrors economic inequality across nations, but not according to levels of social security.

RS18.03

Who are the interventions reaching?

Summerbell, C.

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Tackling childhood obesity is one of the major contemporary public health policy challenges and vital in terms of addressing socioeconomic health inequalities. This talk will attempt to cover the reach of interventions to prevent childhood obesity, and also if the effectiveness of such interventions is different in children from a lower socioeconomic position (SEP) compared with children from a higher SEP. Source material used to inform the talk will include high quality and recently published systematic reviews (for examples, see reference list below). In relation to both reach and differential effectiveness, targeted versus universal interventions will be discussed. Issues relating to the fact that some effective universal public health interventions may increase inequalities by disproportionately benefiting less disadvantaged groups ('intervention-generated inequalities', or IGIs) through differential uptake and/or compliance will be described. Factors influencing IGIs will be explored; 'downstream' preventative interventions are more likely to increase health inequalities than 'upstream' interventions. The talk will conclude with suggestions about the features of interventions to prevent childhood obesity that may result in greater reach and effectiveness in lower SEP children. For example, interventions that rely on written information provision directed at individual behaviour change should be avoided. On the contrary, community-based strategies which include co-production, or policies aimed at structural changes to the environment, appear most useful.

RS19 – How do you manage weight re-gain and comorbidities after surgery?

RS19.01

How do you manage weight re-gain and comorbidities after surgery? – By lifestyle?

[No abstract]

RS19.02

How do you manage weight re-gain and comorbidities after surgery? – By pharmacotherapy?

Pagotto, U.

Italy

Bariatric or metabolic surgery is actually the most effective method to treat severe obesity and its complications as type 2 diabetes. However, surgical approach in 10–30% of patients results in unsatisfactory weight loss or in weight regain within 3 years. The reasons for this failure include many factors related to the type of surgical technique or to the patient eating behavior. The first approach to oppose weight gain after bariatric surgery should be based on diet and physical activity. However, this approach is not always sufficient and more weapons are necessary as pharmacological therapy or surgical reintervention. Indeed, anti-obesity drugs can be used even after bariatric surgery. Nevertheless, in literature, few studies evaluated the results of this type of approach without any clear evidence. Furthermore, it is necessary to consider that bariatric surgery induces relevant hormonal changes that may deeply affect anti-obesity drugs pharmacokinetics and pharmacodynamics. The purpose of the presentation is to review the therapeutic perspectives of obesity pharmacotherapy in patients with failure of bariatric surgery. In particular, we will analyze the mechanisms of action of different anti-obesity drugs in relation to the type of bariatric surgery performed or to the reasons of the bariatric surgery failure.

RS19.03

How do you manage weight re-gain and comorbidities after surgery? – By surgery?

Suter, M.

Switzerland

Background: Roux-en-Y gastric bypass (RYGBP) is the oldest bariatric procedure still widely performed because it has been shown to provide reliable and good overall long-term results. Between 20 and 30% of the patients, however, show poor weight loss or regain significant weight (PWL/WR) in the long-term. Overall, the literature is limited regarding surgical revision of RYGBP for these indications.

Methods: Review of the literature on surgical revision for PWL/WR after RYGBP

Results: Before decision-making, a complete evaluation must be performed. This includes not only an assessment of the anatomy of the RYGBP (pouch size and shape, gastro-jejunostomy, Roux-limb, gastro-gastric fistula) using endoscopy and radiology (upper GI series, CT with volumetry), but also and mostly an evaluation of dietary habits and eating behavior. If dietary and psychological management fail to provide further weight loss, surgery can be indicated to correct an abnormal anatomy (dilated gastric pouch or anastomosis, gastro-gastric fistula) provided the latter is deemed responsible for failure. Short-term results are encouraging, but there is a trend towards weight regain beyond 1–2 years. If the anatomy of the first procedure is found to be normal, two options are available: adding restriction or adding malabsorption. Restriction can be added by implanting an adjustable or non-adjustable band around the gastric pouch. Although technically challenging, this can usually be

done by laparoscopy with an acceptable, but not negligible morbidity. Short-term results are encouraging, but long-term results are unknown, and long-term complications requiring revision are not unusual. Malabsorption can be added by increasing the length of the alimentary limb, bilio-pancreatic, or both, and significantly shortening the length of the common limb. This procedure, which induces a clear risk of proteo-caloric malnutrition, should only be offered to very compliant patients. Weight loss is often acceptable, but significant nutritional issues can develop that sometimes warrant revision to the former bypass anatomy.

Conclusions: Surgical revision is advised for poor PWL/WR after RYGBP is advised in patients when anatomical issues clearly explain failure, and provided there is no dietary or behavioral problem. Most patients regain weight because of dietary issues and/or behavioral problems, and these patients must benefit from dietary/psychological counseling. Adding restriction or malabsorption can be offered to some selected patients, but the risk/benefit ratio must be carefully weighed, since morbidity is far from nihil, and long-term results are largely unknown.

RS19.04

How do you manage weight re-gain and comorbidities after surgery? – In adolescents?

[No abstract]

RS20 – Ethical and Moral Challenges: Obesity as a Socially Defined Disease

RS20.01

Making obesity a disease: why and why not

[No abstract]

RS20.02

Stigmatization of children and adults with obesity

[No abstract]

RS23 – Immuno metabolism

RS23.01

The role of metabolites and their receptors in inflammation

[No abstract]

RS23.02

Inflammation as a therapeutic target in metabolic disease-an update

[No abstract]

RS23.03

Preproglucagon (PPG) neurons in the hindbrain have IL-6 Receptor alpha (IL-6Ralpha) and show Ca²⁺ influx in response to IL-6

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Neuronal circuits in the hypothalamus and the hindbrain are of importance for regulation of food intake, energy burning and fat mass. We have recently shown that treatment with exendin-4 (Ex-4), an analogue of the pro-glucagon derived molecule glucagon-like peptide 1 (GLP-1), markedly increases the mRNA-expression of the cytokine interleukin-6 (IL-6) in the hypothalamus and hindbrain, and that this increase partly mediates the suppression of food intake and body weight by Ex-4. Endogenous GLP-1 in the central nervous system (CNS) is produced by preproglucagon (PPG) neurons of the nucleus of the solitary tract (NTS) in the hindbrain, and these neurons project to various parts of the brain, including the hypothalamus. Outside the brain, IL-6 stimulates GLP-1 secretion from gut and pancreas. In this study, we aim to investigate whether IL-6 can affect GLP-1 producing PPG neurons in the NTS in the mouse hindbrain, via the ligand binding part of the IL-6 receptor, IL-6 receptor- α (IL-6Ra). By using immunohistochemistry, we found that IL-6Ra was localized on GLP-1 expressing neurons of the NTS. Recordings of these neurons in GCaMP3/GLP-1 reporter mice showed that IL-6 enhances cytosolic Ca²⁺ concentration in neurons capable to express PPG. We also show that the Ca²⁺ increase originates from the extracellular space. We found that IL-6Ra was localized on cells in the hindbrain expressing immunoreactive NeuN (a neuronal marker) or CNPase (an oligodendrocyte marker). IL-6Ra immune reactivity was not found in cells expressing GFAP (an astrocyte marker) or Iba-1 (a microglia marker). In summary, IL-6Ra is present on PPG neurons, and IL-6 can stimulate these cells by increasing influx of Ca²⁺ to the cytosol from the extracellular space.

RS23.04

The role of inflammation in the association between adiposity and subclinical atherosclerosis

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Aim: Obesity is a well-established risk factor for cardiovascular disease (CVD). Approximately 45% of this risk is mediated via the traditional risk factors systolic blood pressure, LDL-cholesterol, and glucose concentrations. The mechanisms underlying the remaining part of this risk are unclear. Inflammation is a candidate mechanism because adipocytes excrete cytokines that may lead to a low-grade systemic inflammatory state, which is a risk factor for atherosclerosis and CVD. We investigated

to what extent inflammation, in addition to traditional risk factors, mediates the associations of overall and visceral adiposity with atherosclerosis. **Methods:** In the Netherlands Epidemiology of Obesity study we measured total body fat (TBF) by bio-impedance, carotid artery intima media thickness (IMT) by ultrasound, serum high sensitivity (hs)-CRP concentrations in fasting blood samples in all participants, and visceral fat (VAT) by magnetic resonance imaging in a subgroup (n = 2,249). We examined mediation by hs-CRP in linear regression analyses, adjusted for age, sex, smoking, physical activity, statin use, ethnicity, education, in addition to the traditional risk factors systolic blood pressure, LDL-cholesterol, and glucose concentrations. Analyses of VAT were additionally adjusted for TBF.

Results: Participants (n = 5,653) had a mean (SD) age of 56 (6) years, BMI of 30 (5) kg/m², 50% were women. Per SD of TBF (6%), the IMT was 16.6 μ m (95% CI: 13.6–19.6) larger, which attenuated to 14.0 μ m (11.0–17.2) after adding the traditional risk factors. This association was not further mediated by hs-CRP (proportion mediated: 0%, 95% CI: -1–1%). Per SD of VAT (61 cm²), the IMT was 14.6 μ m (9.6–19.7) larger, which attenuated to 10.1 μ m (4.8–15.6) after adding the traditional risk factors. Adjustment for hs-CRP attenuated this to 9.7 μ m (3.7–15.8), corresponding to a proportion mediated of 4% (3–9%).

Conclusion: Inflammation may mediate part of the association between visceral adiposity and atherosclerosis. More specific inflammatory markers in addition to other novel risk factors need to be investigated to unravel the complete mechanism underlying the association between adiposity and CVD.

RS24 – Cognitive sensory control of meal size

RS24.01

Decision making and food choice

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Eating often feels automatic and it appears to require very little cognitive activity. Indeed, it is often suggested that our obesogenic environment promotes passive uncontrolled overeating and that we are predisposed to 'grazing' behaviour. In this session I will challenge aspects of this proposition by arguing that cognition (memory and learning) often plays a key role in determining what and how much we choose to eat. For example, there is mounting evidence that memory processes and learned expectations affect the fullness that we experience during and after a meal. More importantly, observations of natural eating behaviour indicate that meal size is very often planned in advance, before a meal begins. Foods differ considerably in the satiety that they are expected to confer. This 'expected satiety' is learned and it probably plays an important role in determining the amount of food that we put on a plate. In addition to deciding how much to eat, decisions are also taken about what to eat. Recently, it has become clear that these judgements are not independent and that portion size has a direct impact on the kinds of foods that we choose to consume. More generally, this 'deconstruction' of food choice is important, because it has the potential to expose subtle differences that might gradually impact energy intake over time.

RS24.02

The chemical senses and nutrition: The role of taste and smell in energy intake

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Food choice and food intake are guided by both sensory and metabolic processes. The senses of taste and smell play a key role in the sensory effects on choice and intake. Although taste and smell have an intimate connection in the sensory perception of food, their role in choice and intake is quite different. This role goes beyond palatability. Data show that smell mainly plays an appetizing, priming role in choice and intake. Taste does not serve as an appetizer, but it has a strong role as a macronutrient sensing system, signalling the entrance of nutrients to the brain and the gastrointestinal tract. As a result it is strongly involved in satiation, i.e. meal termination. The different roles of sense of smell and taste in choice and intake are related to their different neurophysiological pathways and psychophysical characteristics. Insight of the role of taste and smell may be used to guide research and food product development into a less obesogenic food environment.

RS24.03

Memory and food choice

Higgs, S.

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Cues associated with food, such as visual, smell and taste cues, are strong motivators of eating. Seeing or thinking about a tasty food can trigger an urge to eat and promote overconsumption. Yet, the influence of food cues on behaviour varies from moment to moment and from person to person. Food is more attractive and tastes better when we are hungry and becomes less appealing when have just eaten. There are also individual differences in responses to food cues: some people respond more strongly to food cues than others do and may find food highly attractive even when they are not hungry. This variability is related to responses in brain reward networks, but our responses to food cues are also influenced by cognitive processes such as memory and attention. For example, holding thoughts about food in working memory increases the attention that is paid to food cues, which can trigger food cravings. In addition, it has been reported that memories of specific recent eating episodes, such as a memory of the last meal that was eaten, play an important role in directing food choices and influencing when and how much we eat. Such cognitive control of eating is important because it allows for flexibility in responding to food cues so that our behaviour is adjusted depending on current needs and/or desires rather than being driven to eat automatically by these cues. However, cognitive control is also prone to disruption. When this happens, eating behaviour may become inflexible and driven by basic reward processes. In the modern food environment, where food cues are abundant, problems with cognitive control of food reward may lead to overconsumption and eventually obesity. This suggests that memory based interventions could provide a novel approach to weight management.

RS25 – Metabolically healthy obesity

RS25.01

What is metabolically healthy obesity?

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Expansion of adipose tissue upon weight influences whole body metabolism and obesity is an important risk factor for type 2 diabetes, dyslipidemia, fatty liver disease, hypertension, cardiovascular disease and cer-

tain types of cancer. However, the individual obesity-related risk for these diseases is not determined by increased fat mass alone. Therefore, there must be factors, which protect a subgroup of obese individuals – so called metabolically healthy obese – against obesity-related diseases. Heterogeneity of body composition, fat distribution and adipose tissue function may underly the variable risk to develop metabolic and cardiovascular diseases associated with increased body fat mass. Central body fat distribution has been shown to better predict obesity-related cardiometabolic diseases than whole body fat mass or body weight. Dysfunction of adipose tissue maybe initiated by an inability of adipose tissue to increase body fat mass by recruiting new (healthy) adipocytes, which activates a sequence of pathological mechanisms including cellular insulin resistance and increased lipolytic capacity, intracellular accumulation of toxic molecules, activation of stress pathways, visceral (ectopic) fat accumulation, changes in the cellular and intracellular matrix composition, increased number of immune cells within adipose tissue, increased autophagy and apoptosis, fibrosis, alterations in gene and protein expression patterns. Most likely, impaired adipocyte function is caused by genetic, behavioural and environmental factors which are not entirely understood. As a result of impaired subcutaneous adipose tissue expandability, adipocytes become larger and release signals (e.g. hormones, cells, metabolites) resulting in a proinflammatory, diabetogenic and atherogenic serum profile. These adverse signals may contribute to inflammation of adipose tissue and secondary organ damage in target tissues such as liver, brain, endothelium, vasculature, endocrine organs and skeletal muscle. After the discovery that adipose tissue is an active endocrine organ ~20 years ago, more than 600 bioactive factors are considered as adipokines. Adipokines play specific roles in the regulation of appetite and satiety, immune response and inflammation, glucose and lipid metabolism, insulin sensitivity, hypertension, vascular growth and function, atherosclerosis development, bone development, growth and other biological processes. Elucidating the mechanisms of adipose tissue dysfunction may lead to the identification of novel treatment targets for obesity, type 2 diabetes and other diseases.

RS25.02

Metabolically healthy obesity: Does it exist? – adult perspective

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It has been recognized for some time that increased weight may not cause apparent cardiometabolic abnormalities in some individuals, as there exists a group of individuals who are obese but have no metabolic dysfunction, the so-called “metabolically healthy obesity” (MHO) or “benign obesity”. In fact, these individuals represent an intriguing phenotype that may have particular characteristics protecting them from the development of the vascular risk factors that typically arise in the setting of overweight/obesity such as hypertension, type 2 diabetes mellitus, and dyslipidemia. Previous reports aiming to characterize MHO individuals have yielded important insights regarding potential “protective” characteristics such as age, a more favorable distribution of adipose tissue, and fitness. However, despite presenting without apparent adverse cardiometabolic sequelae, these individuals are in fact at increased risk for adverse events, type 2 diabetes and subclinical cardiovascular disease arguing against this concept of “being obesity”.

RS25.03

Metabolically healthy obesity: Does it exist? – adolescent perspective

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Patients with obesity in childhood are burdened by more than 20 medical and psychosocial complications which in many ways negatively impact thriving, growth, and development in children and adolescents. Adolescent patients with obesity face potentially more than 20 forms of cancers in adulthood. The American Medical Association and The Canadian Medical Association declared obesity as a disease in 2013 and 2015, respectively, process which is also under development in Europe. In The Children's Obesity Clinic in Denmark, more than 2.100 patients have been included in treatment since 2008 with an average age of 11.5 years, where 50% of the patients exhibit pre- or overt hypertension, 35% exhibit NAFLD, 28% exhibit dyslipidemia, and 18% exhibit prediabetes. In the understanding of a subgroup of obese patients regarded as metabolically healthy resides a risk of negligence of obesity per se, the development of other obesity related complications, and the development of cancers in adulthood. This development thus carries the risk of reducing the degree of health and/or psychosocial functioning in these patients in the future. Further, health care professionals have a tendency to treat classical obesity complications such as depression, hypertension, dyslipidemia, and type 2 diabetes with specified medicaments, though without addressing the underlying cause of obesity in treatment, which obviously conflicts with the golden scientific standard of curing the cause of the disease. Thus, accepting the existence of metabolic healthy patients with obesity may actually tend to conflict with the Hippocratic oath if obesity is declared as a disease in Europe. The potential consequences of declaring obesity as a disease upon stigmatization and discrimination is regarded relatively minor in comparison to neglecting the disease burden in a large group of patients with obesity if treatment is hindered.

RS27 – State of the art management in the elderly

RS27.01

The obesity-depression link in older persons

[No abstract]

RS27.02

Weight loss in the elderly: Emphasis on food or exercise?

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The global epidemic of obesity not only affects many adults but it has also its implications on both ends of the age spectrum: in children and adolescents on the one side and in the elderly on the other. By the year 2035 over 20% of the adult US population and over 25% of the Europeans will be 65 years or older. Prediction models estimated a prevalence of 32 million obese elderly subjects in Europe. One has to realize that cut-off values of body mass index, waist circumference, and percentages of body fat mass, have not been defined for the elderly, let alone for the elderly of different ethnicities. From several meta-analyses it appears that overweight as such is not detrimental and presumably even beneficial for the elderly, and mortality and morbidity associated with an excess body weight and body fat only increases at a body mass index > 30kg/m². In contrast to the very young and adult population this signifies that treatment should only be offered to patients aged 65 or older who are obese and who have functional impairments, metabolic complications, or obesity-related dis-

eases, that can benefit from weight loss. Another complicating factor is that in the elderly both obesity and sarcopenia happen to come together and this combination of an unhealthy excess of body fat with a detrimental loss of muscle and fat-free mass including bone mass, has to be taken into account when instituting a weight loss therapy. Weight losses should be gradual and should minimize the chance of muscle and bone loss. Therefore, lifestyle intervention should be the first step and consists of a diet with a 500 kcal energy deficit and an adequate intake of protein of high biological quality, together with calcium and vitamin D. Measures to counteract the disturbed anabolic reaction to food should be taken by supplying protein-rich foods with breakfast, after exercise and before the night rest. Also, behavioural therapy and multicomponent exercise are part of the lifestyle programme. Multicomponent exercise includes flexibility training, balance training, aerobic exercise, and resistance training and knowledge of constraints, barriers and modulators of physical inactivity should be of help to engage the elderly in physical activity. It is clear that neither food nor exercise should be emphasized in their own, but the combination of both is the best strategic alliance in treating obesity in the elderly.

RS27.03

Nutrition and the ageing process

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Over the past 2 centuries human life expectancy has increased dramatically and continues to do so. Genetic factors account for about one third of variation in life expectancy so that most inter-individual variation in lifespan is explained by stochastic and environmental factors, including diet. In model organisms, dietary (energy) restriction is a potent, and highly reproducible, means of increasing lifespan and reducing the risk of age-related dysfunction although whether this is strategy is effective in humans is unknown. This is ample evidence that the ageing process is plastic and ongoing biological research demonstrates that ageing is driven by the accumulation of molecular damage which causes the changes in cell and tissue function which characterise the ageing phenotype. This cellular, tissue and organ damage results, eventually, in the development of age-related frailty, disabilities and diseases. Obesity has a significant adverse effect on the ageing trajectory, a process which may be driven by inflammation-related molecular damage. There is compelling observational and interventional evidence that eating patterns e.g. the Mediterranean dietary pattern also influences human ageing but limited evidence about intervention modalities which can be used to produce such sustained improvements dietary behaviour. Current research needs include i) better understanding of the causal biological pathways linking dietary factors with the ageing trajectory, ii) the development of lifestyle-based interventions, including dietary changes, which are effective in preventing age-related disease and disability and iii) the development of robust markers of healthy ageing which can be used as surrogate outcome measures in the development and testing of dietary interventions designed to enhance health and wellbeing long into old age.

RS27.04

What does the future hold?

[No abstract]

RS29 – Adipogenesis

RS29.01

Adipogenesis and its role in metabolic disorders

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Adipogenesis is the cellular event corresponding to the formation of a differentiated adipocyte from a non-differentiated cell. Cell tracking approaches in mice models as well as flow cytometry coupled with cell sorting approaches in human characterized the phenotype of the non-differentiated cells present in the stroma-vascular compartment of white adipose tissue with adipogenic potentials. Several questions still remain open concerning 1) the nature of the adult white adipose tissue derived adipogenic cells in terms of stemness and lineage, especially concerning the beige and white adipocyte differentiation potential and 2) the origin of the heterogeneity in adipocyte progenitor cells according to fat mass locations: intrinsic (distinct embryonic origin) or extrinsic (impact of microenvironment). In adults, adipogenesis occurs to renew mature adipocytes and in obesity/high fat diet context adipogenesis promotes adipocyte hyperplasia in a fat depot-dependent manner. Several observations point out the major role of adipogenesis in the buffering function of the fat mass against lipid excess. Indeed, alteration of adipogenesis as observed in lipodystrophic syndrome or via genetic manipulation in mice models are associated with changes in whole body energy homeostasis leading to metabolic disorders while stimulation of adipogenesis as promoted by ligands of PPARgamma, the master transcription factor involved in adipogenesis, is beneficial in particular in subcutaneous fat depot. The inability to expand the fat mass by hyperplasia through adipogenesis might then be a major event contributing to alteration of metabolic health associated with obesity. Impairment of adipogenesis in white adipose tissues with obesity might be due to the changes in fat mass microenvironment. Immune cells that accumulate with obesity are, through their production of cytokines, potent inhibitors of both white and beige adipogenesis. Fibrosis might also be a restricted factor. Finally, recent studies point out the role of aging or senescence in decreasing adipogenic potential. Therefore, approaches aiming to restore/stimulate adipogenesis and more particularly beige adipogenesis might be promising approaches to promote metabolic health in the context of obesity.

RS29.02

How does the origin of adipocytes impact on metabolic health?

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It is now well documented that adipose tissues having different impact on the metabolic complications of obesity possess distinct developmental gene signatures, suggesting that embryonic origins may contribute to adipocyte properties. Adipocytes, like other mesenchymal cell types, are generally described to derive from mesoderm. However, during development of higher vertebrates, the mesoderm is not the only germ layer source of mesenchymal cell. Analysis of the early steps of adipocyte development in mouse Embryonic Stem Cell allowed us to reveal that neural crest (NC, better known to generate neuronal cells and glial cells), rather than mesoderm, is the source of adipocytes. Then, primary cultures of developing quail NC showed that both cranial and trunk NC cells are able to differentiate into adipocytes. Finally, a lineage tracing approach in transgenic mice demonstrated that a subset of adipocytes in the cephalic region, but not in the trunk, originates from NC during normal development. The

impact of the embryonic origin on adipocyte properties remains to be determined in mice. Then, we focused our studies on the embryonic origins of adipocytes in humans, and on what could be the impact on their phenotype. To address these questions, we have investigated the in vitro development of human induced Pluripotent Stem Cell (iPSC), similar to human Embryonic Stem Cells. Two types of adipose progenitors with different embryonic origins have been identified from hiPSCs, in agreement with mice studies. Cranial neural crest-derived adipose progenitors (PAX3+) undergo differentiation into brown-like adipocytes whereas non cranial NC-adipose progenitors (PAX3-) differentiate into white adipocytes. PAX3 expression is maintained in human adults, and we showed that it marks preferentially UCP1-expressing adipose tissue depots localized at the upper part of the body. Altogether, we propose that brown-like adipocytes and white adipocytes derived from different embryonic origins in humans. A thorough understanding of the signals that govern the generation and the differentiation of PAX3+ cells during human pluripotent stem cell development could open new opportunities to identify events that regulate the recruitment of brown-like adipocyte and to develop alternative strategies to counteract obesity.

RS29.03

ADAMTS5 promotes murine adipogenesis and visceral adipose tissue expansion

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Background & Aims: Adipose tissue (AT) expansion includes adipocyte hypertrophy, hyperplasia (via adipogenesis), angiogenesis and extracellular matrix remodeling. Enhanced expression of ADAMTS5 (A Disintegrin and Metalloproteinase with Thrombospondin type 1 motifs; member 5) has been observed in AT of obese rodents. In addition, ADAMTS5 has anti-angiogenic properties in tumor models. Here, we further investigated the potential functional role of ADAMTS5 in AT biology.

Objectives: to elucidate the role of ADAMTS5 in adipogenesis, AT expansion and associated angiogenesis.

Material/Methods: in vitro differentiation of precursor cells into mature adipocytes was studied using murine embryonic fibroblasts (MEF) derived from wild-type (Adamts5+/+) and ADAMTS5 deficient (Adamts5-/-) mice, or 3T3-F442A preadipocytes with stable shRNA-mediated Adamts5 gene silencing. De novo adipogenesis was monitored by injection of 3T3-F442A cells with or without Adamts5 knockdown in Nude mice. Furthermore, Adamts5+/+ and Adamts5-/- mice were kept on a high fat diet (HFD) to monitor AT development in nutritionally-induced obesity.

Results: Adamts5-/- MEF, as well as 3T3-F442A preadipocytes with Adamts5 knockdown, showed significantly reduced differentiation as compared to control cells. This was shown by both Oil Red O staining (intracellular lipids) and gene expression of adipogenic markers. In mice, de novo formed fat pads arising from 3T3-F442A cells with Adamts5 knockdown were significantly smaller as compared to controls. After 15 or 25 weeks on HFD, total body weight and subcutaneous AT weight were similar for Adamts5+/+ and Adamts5-/- mice, but visceral/gonadal fat mass was significantly lower for Adamts5-/- mice. These data were confirmed by magnetic resonance imaging. In addition, the blood vessel density in adipose tissue was higher for Adamts5-/- mice kept on HFD.

Conclusion: Our data support the concept that ADAMTS5 promotes adipogenesis in vitro and in vivo, as well as development of visceral AT and associated angiogenesis in mice kept on HFD.

Effects of omega-3 PUFAs on brown and beige adipocyte differentiation and activation

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Several experimental and epidemiological data indicate that omega-3 PUFAs may protect against obesity-induced alterations such as type II diabetes, and sometimes on obesity itself. Brown adipose tissue (BAT) activation and especially the browning of white adipose tissue (WAT) are considered protective processes against obesity and potential mechanisms for draining glucose and protecting against diabetes. We undertook a cell-based study to determine the role of omega-3 PUFAs on brown and beige adipocyte differentiation and activation. We used precursor cells obtained from interscapular BAT (iBAT) and inguinal WAT (iWAT) and differentiated them into brown and beige phenotype, respectively, *in vitro*. Eicosapentaenoic (EPA), alpha-linolenic (ALA) and docosahexaenoic (DHA) acids induced the adipogenic differentiation of precursors from iBAT and iWAT, as assessed from cellular morphology (multilocular lipid droplet accumulation) and gene expression. EPA (100 μ M) was the most effective fatty acid inducing this action, and an especially intense effect was found for the induction of the expression of marker genes of thermogenesis (e.g. UCP1, PGC-1 α , CoxIV, Sirt3). This was associated with enhanced oxidation of 14C-oleic acid and increased local thermogenesis, as assessed by high resolution thermography. The expression of the FGF21 gene was strongly induced by EPA, thus leading to high secretion of FGF21 protein to the medium. In addition to the effects upon differentiation, EPA also induced the expression of thermogenic genes when added to already differentiated brown and beige adipocytes for 24h. The effects of EPA were not blunted in brown adipocytes differentiated from PPAR α -null mice precursor cells. Analogously, the PPAR γ inhibitor GW9662 did not alter the aforementioned EPA effects. It is concluded that omega-3 PUFA have cell autonomous effects promoting brown and beige differentiation and thermogenic activation and act through PPAR-independent mechanisms.

RS30 – Physical activity and nutritional assessment in children

Physical activity and nutritional assessment in children. What is new and reliable? Can mHealth help?

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Childhood overweight and obesity is a global issue affecting around 42 million children under the age of five. If the present trends persist roughly 70 million young children will be classified as overweight or obese by 2025. Childhood obesity is of serious concern because it can persist into adulthood and cause serious health and economic consequences for both the individual and society. There is a need to target young children and conduct interventions in the pre-school years. In order to conduct such interventions accurate and simple methods are needed to collect dietary data, physical activity and body composition. Weighed or estimated food records and 24hr dietary recalls are commonly used to obtain dietary data, however these methods are burdensome on the participants and have limited accuracy. New techniques that reduce participant burden, are easy to administer, and can be scaled are warranted. Recent data suggests that participants favor dietary assessment using mobile phones over traditional methods. Additionally, in the past 5–10 years there has been a huge

increase in research on the use of mobile phones (including smartphones) for delivering behaviour change interventions in order to increase physical activity, improve dietary habits or to achieve weight loss. The benefits of such mobile health (mHealth) programs are: they can be delivered anywhere at any time, are interactive, and can be tailored to meet people's needs. In this speech I will discuss current knowledge regarding the accuracy of dietary, physical activity and body composition assessments in children, with focus on the preschool years. During my speech I will report results and share experiences from the MINISTOP (Mobile phone based intervention to stop obesity) trial. The data collection for the MINISTOP trial was finalized in October 2015. Briefly, the MINISTOP trial aims to evaluate the impact of a 6-month mHealth intervention on body fatness, dietary habits and physical activity in 4-year-olds (Delisle et al *BMC BMC Public Health* 2015;15:95). The trial includes a nested validation study of the wrist-worn Actigraph accelerometer, to assess physical activity energy expenditure as well as a validation of our newly developed tool to assess energy and food intake called Tool for Energy Balance in Children (TECH). By means of TECH intake of foods and energy are collected through the parents' mobile phones using digital photography. In the trial, parents have also reported physical activity and dietary behaviours on a daily-weekly basis through the intervention (mobile phone app) and the parent's experiences as well as the results from this part will also be summarised.

Adolescents' communication of high calorie low nutrient food items in image-based social media

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Background & Aim: Adolescents today use social media applications extensively and research demonstrates that peers in social media settings can influence adolescents regarding their food intake. These newly emerged channels also offer unique possibilities to observe adolescents' dietary communication. This study aimed to explore how adolescents communicate food images in a widely used social media image-sharing application, Instagram.

Material/Methods: To find adolescent Instagram users we searched for images appended with the hashtag #14år (Swedish for "14 years"). See Figure 1 for the complete sampling procedure. We excluded accounts that we judged did not belong to adolescents (based on written and visual profile information); 1001 unique Instagram users' photo streams were thus eligible for analysis. Content analysis was used to identify food items and categorize these based on types of food and how the food items were presented.

Results: Most of the adolescent users (85%) shared images containing food items. A majority of the images (67.7%) depicted foods high in calories but low in nutrients. Almost half of these images were arranged as a still life with food brand names clearly exposed. Many of these images were influenced by major food marketing campaigns. Fruits and vegetables occurred less often, in 21.8% of all images. This food group was frequently portrayed zoomed in with focus solely on the food, with a hashtag or caption expressing palatability. These images were often presented in the style of a cook book.

Conclusion: Food was presented in varied ways. Adolescents themselves produced images copying food advertisements. This has clear health promotion implications since it becomes more challenging to monitor and tackle exposure to marketing of unhealthy foods to young people in these popular online networks. Shared images contain personal recommendations, which mean that they may have a more powerful effect than commercial food advertising.

Acknowledgement: This study was supported by grants from Formas – The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (#259–2012–38) and is an activity within the epidemiological centre EpiLife (Forte 2006–1506). We would also like to affirm our respect for Instagram users and their publically shared images.

RS30.03

School effects on sedentary behaviour in 5–6 year old children

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Background/Aims: Excessive sedentary behaviour has been associated with childhood obesity. Schools offer an environment in which healthy lifestyle behaviours can be promoted and practised. Previous studies in older children (10–12 years) have shown that children are sedentary for around two-thirds of school-time. This study aims to investigate school effects on sedentary time in 5–6-year-old children, and the relationship between school-time allocation for breaks and physical education (PE) and sedentary time, within and outside of school hours.

Methods: We used baseline data from 962 children from 50 schools in the West Midlands, England participating in the WAVES childhood obesity prevention trial. Sedentary time was measured using accelerometers worn for up to 5 days. School physical activity (PA) opportunities were identified through a school questionnaire. Adjusted random effects multilevel models were developed to determine associations between school PA opportunities and children's in- and out-of-school sedentary time. Intra-class correlation coefficients (ICCs) were calculated to estimate the proportion of variance attributed to between-school differences. Gender differences were explored.

Results: On average children were sedentary for 30% of school-time (108.5 min/day), but total daily sedentary time was greater during weekend, compared to school days (464 vs 421 minutes). Significant variation was found between in- and out-of-school sedentary time that could be attributed to differences between schools. The strongest effect was for in-school-time ($\chi^2 = 72.50$, $p < 0.0001$, $ICC = 0.135$) showing that 13.5% of total variation in school sedentary time is explained by school differences. Overall, there is a trend of decreasing school-time sedentary behaviour with increased school PA opportunities. However, gender-specific analyses suggest that school PA opportunities are somewhat associated with both less overall and out-of-school sedentary time in boys, but the opposite in girls. There was a significant positive association between school provision of PE and breaks and non-school sedentary time in girls ($B = 8.89$ min/day (1.00, 16.79), $p = 0.027$).

Conclusions: The school PA environment is associated with children's sedentary time. The relationship between school PA opportunities and girls' sedentary behaviours is concerning and warrants further investigation. In addition, strategies to reduce children's sedentary time at week-ends should be prioritised.

RS30.04

Perceived fussy eating in children at 14 months of age and subsequent use of maternal feeding practices at 2 years – the NOURISH cohort

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Background: Despite research focus on childhood obesity, many parents of young children worry that their child is not eating enough. Up to 40% of parents characterise their child as fussy or having an 'eating problem'.^{1,2} Feeding practices – prompted by parental concern – that are not responsive to children's innate cues of hunger and satiety may promote overeating and overweight.³ This prospective analysis investigates characteristics

associated with maternal-reported fussiness at age 14 months and feeding practices at age 2 years.

Methods: A secondary analysis of data from mother-child dyads in the NOURISH4 control group ($n = 229$) measured at mean child age 14 months – perception of food fussiness, demographics, weight-for-age z-score⁵ derived from measured weight, and food group intake (grams) on 24-hr recall; and 24 months – Feeding Practices and Structure Questionnaire (FPSQ).⁶ Structural equation modelling tested the relationships: maternal and child characteristics → perceived food fussiness → maternal feeding practices (FPSQ).

Results: Thirty percent of children were perceived as a fussy eater. No children were underweight ($WAZ < -2$). Perception of child as a fussy eater at 14 months was independent of demographic characteristics and intake (perception was associated with lower WAZ cross-sectionally, but this association was not significant in the longitudinal model). Perception as a fussy eater did predict Distrust in Appetite ($\beta = .57$, $p < .001$), Reward for behaviour ($\beta = .66$, $p < .001$), Overt restriction ($\beta = .29$, $p = .02$), Reward for eating ($\beta = .87$, $p < .001$), and Persuasive feeding ($\beta = .86$, $p < .001$) at age 2 years; $\chi^2/df = 1.72$, $RMSEA = .06(.05-.06)$, $PCLOSE = .02$.

Conclusion: Maternal perception of fussy eating was prospectively associated with non-responsive feeding practices. Use of these practices appears to be independent of objective measures of child weight and intake and may undermine self-regulation and promote overweight.

RS30.05

Overweight children consume larger meals: Data from the Diet and Nutrition Survey of Infants and Young Children (DNSIYC)

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Background: It has been the subject of much debate whether overweight individuals consume more energy during their eating occasions (larger 'meal sizes') and/or eat more frequently (greater 'meal frequency') than lean individuals. Research with adults is limited by the potential for under-reporting of intake, particularly among the overweight. We use parent-reported intake for very young children from a large dietary dataset in the UK to establish whether meal size or meal frequency is more important for weight.

Methods: We evaluated data from 3 and 4-day diet diaries collected in 2564 children aged 4–18 months from the 2011 Diet and Nutrition Survey of Infants and Young Children (DNSIYC) to assess cross-sectional associations between 'meal size' (energy intake per eating occasion) and 'meal frequency' (number of eating occasions), and i) weight (kg) and ii) weight status. Analyses were conducted using linear and logistic regression models, adjusted for age, sex and birth weight.

Results: Meal sizes were higher in overweight/obese children than normal-weight children (means = 141 versus 129 kcal, $P < 0.001$), with a 3% increased risk of overweight/obesity for every 10 kcal increase in meal size (OR: 1.03; 95% CI, 1.01–1.05). Overweight children consumed larger meals (160g versus 146g, $P < 0.001$), with a slightly greater percentage of protein (means = 12.4% versus 12.0%, $P = 0.005$) than normal weight children, however there were no significant differences in the energy density, fat or carbohydrate content of their meals. A linear association between meal size and weight (kg) ($B = 0.02$, $P < 0.001$) indicated that children weighed 0.02kg more for every additional 10 kcal increase in meal size. There were no significant associations between meal frequency and weight or weight status.

Conclusions: Meal size but not meal frequency may be a potential risk factor for the development of childhood overweight in very early life. Longitudinal analyses are needed to establish causation.

RS32 – Can we learn anything from Omics?

RS32.01

Can we learn anything from Omics? (Yes)

[No abstract]

RS32.02

Can we learn anything from Omics? (No)

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The identification of physiological and biological factors underlying the metabolic disturbances observed in obesity is a key step in developing better diagnostic tools and therapeutic strategies. Obesity is a complex condition characterized by an increased fat mass. Probing adipose tissue using Omics has provided key information on the molecular determinants of obesity-related metabolic complications. Transcriptomics approaches have shown the occurrence of adipose tissue inflammation associated to expanded fat depots. Later studies revealed an opposite regulation between metabolism and immune response genes including novel human adipose tissue-specific macrophage markers. These studies suggested that impairment of fat cell metabolism favors an immune response in adipose tissue. Omics tools have also proved very useful in probing adaptations to dietary interventions. Nutrigenetics and nutrigenomics have provided major information in that respect. The series of studies performed in the EU-funded Diogenes program revealed that differences in adipose tissue gene expression patterns between subjects successful and unsuccessful in maintaining weight are mainly due to weight variations rather than to differences in diet macronutrient composition. Differences in Gender had a marked influence on adipose tissue gene expression which persisted during dietary intervention. Some genes show metabolic syndrome and insulin resistance signatures common to men and women. Cis genetic variants influence basal adipose tissue gene expression. Integration of other Omics data (e.g. microRNAs, lipidomics, ...) and advanced biostatistical and bioinformatics (e.g., system model networks) tools unraveled unsuspected nodes controlling metabolic status. Owing to their properties and roles, circulating microRNAs may become biomarkers of potential clinical use in patient stratification for assessment of nutritional intake and metabolic risks. Answering No to the query “Can we learn anything from Omics?” is a foolish expedition esp. from a lab that has worked on (and got grants for) investigating Omics in obesity for more than 15 years. Yet, one must have a lucid view at the challenges and ask the proper questions. Why are there no (or very few) novel validated plasma biomarkers routinely used in the clinic for assessment of the risks for obese individuals of developing diabetes or cardiovascular diseases? Which genetic variants bring significant contributions to these risks? Personalized medicine in our field is a fascinating concept but, to date, it remains a concept i.e. an abstract mental representation of what the Omics shall deliver.

Wednesday, 1 June, 2016

AS1 – The I. Family cohort: Childhood obesity in relation to genes, families and environments

AS1.01

Introduction to the I. Family cohort

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I. Family builds on the success of the IDEFICS cohort established in 2007 with 16,228 children recruited from eight European countries aged 2 to 9.9 years at the first examination. An extension and a further follow-up of the IDEFICS children's cohort was performed in the framework of the EU FP7 project I. Family to create a longitudinal database of children and their families. Approximately 7,000 IDEFICS children, their parents, and around 2,500 siblings thereby participated in a second examination in 2013–2014. In this follow-up study we uniquely investigate dietary behavior, food choice and lifestyle within families. Repeated measurements of social and behavioural factors, individual genetic characteristics, and medical parameters are studied in relation to health behaviours, in particular healthy food choice, and health outcomes such as obesity followed in the original cohort. Information on health and nutrition behaviour are complemented with data on parenting style and family life, by including siblings and parents. Thus, a full picture of diet and the interplay of diet-related factors in whole families will be obtained accounting for social and environmental factors. It will be possible to determine the influence of families on children's behaviour and to study the transition from childhood to adolescence when this influence diminishes and is supplemented by peer pressure and other non-family-related factors.

AS1.02

Does the FTO gene interact with the socioeconomic status on obesity development of young European children? Results from the IDEFICS study

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Various twin studies revealed that the influence of genetic factors on psychological diseases or behavior is more expressed in socio-economically advantaged environments. Other studies predominantly show an inverse relation between socio-economic status (SES) and childhood obesity in western developed countries. The aim of this study is to investigate whether the FTO gene interacts with the socio-economic status (SES) on childhood obesity in a subsample of the IDEFICS cohort (N = 4406). A structural equation model (SEM) is applied with the latent constructs obesity, dietary habits, physical activity and fitness habits, and parental SES to estimate the main effects of the latter three variables and a FTO polymorphism on obesity. Further, a multiple group SEM is used to explore whether an interaction effect between the single nucleotide polymorphism rs9939609 within the FTO gene and SES exists. Overall model fit was inconsistent (RMSEA = 0.05; CFI = 0.79). Significant main effects are shown for SES (standardized β s = -0.057), the FTO homozygous risk genotype AA (β s = 0.177) and physical activity and fitness habits (β s = -0.113). The ex-

plained variance of obesity is about 9%. The multiple group SEM shows that SES and FTO interact in their effect on childhood obesity ($\Delta\chi^2 = 7.3$, $df = 2$, $p = 0.03$) insofar as children carrying the protective TT genotype are more susceptible to a favourable social environment.

AS1.03

Diet and Gene expression

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The development of new dietary-related biomarkers is crucial for nutrition research to enable a more accurate and objective assessment of food intake. Of special interest are biomarkers of consumption of food rich in simple sugars and fat, as their intake has been associated with obesity development. The transcriptional profile of peripheral blood cells (PBCs) has been proposed as a useful instrument to assess the physiological and nutritional effects of food, and can also be useful to identify biomarkers for sugary and of fatty foods. This has been one of the objectives of the European I. Family project. In this sense, gene expression studies were performed in a subgroup of 463 children from the IDEFICS cohort selected to include similar number of boys and girls, with normal-weight and overweight, belonging to eight European countries. Potential associations between the transcripts of selected genes, particularly taste-receptor-type-1-member-3 (TAS1R3) and urocortin II (UCN2) genes in PBCs and the frequency of sugary and fatty food consumption in children were studied (Priego et al., J Clin Endocrinol Metab, 100(9):3556–64, 2015). Results showed that children with low frequency consumption of sugary foods displayed higher TAS1R3 expression levels with respect to those with intermediate or high frequency. In turn, children with high frequency consumption of fatty foods showed lower UCN2 expression levels with respect to those with low or intermediate frequency. Moreover, transcripts of TAS1R3 were related with BMI and fat-mass changes after a two-year follow-up period, with low expression levels of this gene being related with increased fat accumulation overtime. It can be concluded that transcripts of TAS1R3 and UCN2 in PBCs may be considered as potential biomarkers of consumption of sugary and fatty food, respectively, to complement data of food-intake questionnaires.

AS1.04

Urinary sugars to validate and calibrate dietary instruments: A study on children eating a freely chosen diet

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Measurement error in self-reported sugar intake may explain the lack of consistency of associations between dietary sugars and disease risk. Urinary sucrose and fructose have been suggested as sensitive and valid biomarkers for sugar intake even with a single morning urine sample. We used a newly developed web-based 24-hour dietary recall (SACANA) and compared dietary sugars as measured by SACANA with sucrose and fructose levels in urine samples to assess the agreement between both measurements. During the period April 2013 to April 2014, a single morning urine sample was collected from 202 children participating in the I. Family study and were administered SACANA. Urinary sucrose and D-fructose were determined using an enzyme-based kit (Boehringer Mannheim/R-Biopharm) by absorptiometry. Concentrations ranged between 1–150 μ g/ml of urine. Concentrations were also expressed as μ g/

mg of creatinine to correct for fluctuations in urine volume. Since urinary fructose and sucrose levels were not normally distributed values were log-transformed. Dietary sugar intake was estimated from SACANA both as simple sugars and as food groups that contribute most to simple sugar intake. The I.Family 59-food items frequency questionnaire (FFQ) was used to calculate a sugar propensity score (ratio of frequencies of sugar rich items consumed to total food items). Observations from 183 children were available to compare urinary sugar excretion with sugar intake on the day before. Medium term analysis was also performed, comparing urinary sugars with food and nutrient estimations from average measures of all available SACANA administrations (up to nine), and with FFQ variables. Urinary fructose and sucrose correlated fairly well with total sugar consumption (Pearson's $\rho = 0.33$, $P < 0.001$). Correlation with total sugar intake was similar for urinary fructose and urinary sucrose taken alone (Pearson's ρ , 0.31 and 0.30, both $P < 0.001$). Variation in sugar intakes explained only a modest amount of variation in urinary sugar excretion. In unadjusted models, total sugar intake explained 3.2% of urinary fructose excretion, and 9.2% of the sum of urinary fructose and sucrose. The adjusted models (by age, sex and body mass index) explained 7% of urinary fructose excretion and 22% of the sum of urinary fructose and sucrose. In all models log transformed and creatinine corrected urinary excretion were used. Our data support the validity of SACANA for assessing sugar intake in children with correlations being similar to those found in adults. However, the fact that variation in estimated dietary sugar intake was only partly explained by variation in urinary sugar excretion suggests caution when using these biomarkers to assess sugar consumption without consideration of other factors influencing urinary sugar excretion.

AS1.05

Familial resemblance in nutritional status in I.Family

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Background & Aims: The overriding objective of the I.Family study is to investigate familial determinants of healthy body weights and nutrition-related behaviors in children and adolescents. To this end, we aimed to quantify the degree of familial resemblance in nutritional status. **Material & methods:** The study sample consisted of 4798 nuclear families with 17387 individuals from 8 countries. Nutritional status was assessed in parents (age 24 to 71 years) and their children (age 2–19 years) based on anthropometric measurements (height, body weight, waist circumference) and resulting indices (body mass index and waist-height ratio), bioimpedance analysis of body composition (% fat and lean mass), diet quality indicators (propensities to consume fat, sugar, and fruit and vegetables) derived from a food frequency questionnaire and risk factors for metabolic disease (blood pressure, HbA1c, blood lipids) determined by standard techniques. Interclass and intraclass correlations were calculated for all relative pair types. Familiality, i.e. the proportion of phenotypic variation attributable to genetic and shared environmental effects, was estimated using variance component methods.

Results: All traits were moderately and significantly correlated ($r = 0.2$ – 0.5) among biologically-related family members. For most traits, sibling correlations tended to be stronger than parent-offspring correlations and mother-offspring correlations for cholesterol and diet were stronger than father-offspring correlations. Although significant, spouse correlations were weaker for most traits than those of first-degree relatives. Height and diet quality indicators were notable exceptions with spouse correlations reaching a similar magnitude as those of first-degree relatives. Familial factors explained 42–76% of the variance in anthropometric traits, diet quality indices, and cardio-metabolic risk factors.

Conclusions: The results of this large multi-center European study confirm a substantial familial resemblance in nutrition and obesity-related traits. These may arise from shared genetic factors between biologically-related relatives, shared family environmental factors between family members living in the same household and assortative mating/social homogamy between spouses. Further research is needed to better under-

stand the factors that modify the familial resemblance and guide family-based interventions to prevent childhood obesity.

AS1.06

Peer influences on weight, dietary patterns and physical activity

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Background: There have been several recent advances academia that have assessed whether peers affect obesity among adolescents and adults. Understanding whether peer effects exist in obesity is important primarily because it would make targeted policies more effective and boost the potential benefits of interventions through the so-called social multiplier. Also, the potential mechanisms through which peer effects operate upon individual bodyweight are still underexplored. **Data:** Thus, this study examines peer effects on obesity in a sample of teenagers aged 12–16 in eight European countries and define peer groups using nominated friends within schools. The data stems from the I.Family survey ('Determinants of eating behaviour in European children, adolescents and their parents'), which was conducted in 2013.

Results: Our results show that peer effects indeed exist among 12 to 16-year-old teenagers in Europe irrespective of whether BMI, waist circumference or body fat is used, although estimates differ in magnitude. We also find that those effects are stronger among individuals at the upper end of bodyweight distribution, especially for body fat. Regarding possible pathways through which peers influence a teenager's fatness, three main findings are worth noting: first, we find evidence that teenagers' less healthy food consumption is positively associated with their friends' less healthy food consumption. Second, however, there is no association between teenagers' healthy food consumption and their friends' counterparts. Third, teenagers' time spent on physical activity and AVM are positively correlated with time spent on those activities among their friends. Those findings may suggest that peer effects on teenagers' fatness could operate through friends' dietary styles, particularly unhealthy food consumption, and physical activity behaviour.

AS2 - Translating Health-Related Quality Of Life (HRQOL) Research into Clinical Practice for Adults and Youth

AS2.01

Translating Health-Related Quality Of Life (HRQOL) Research into Clinical Practice for Adults and Youth

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Obesity has been associated with reduced health-related quality of life (HRQOL), including physical, emotional, psychological and social functioning, and improvements in HRQOL are often associated with weight loss. Although numerous studies have assessed HRQOL, diverse measures have been used, making results difficult to compare, and not all measures have been validated psychometrically. In addition, HRQOL has been primarily a research tool, with little translation into use in clinical practice for evaluating and optimizing treatment. In this symposium we begin with a general discussion of measurement of HRQOL. Next we review the pediatric and adult literature on HRQOL in obesity and weight loss. We then discuss how to interpret scores for clinical use, including novel meth-

ods of providing immediate feedback to healthcare providers, patients and families. The next section describes a national health project in the Netherlands in which HRQOL is used to optimize treatment of obesity for youth, providing feedback to healthcare providers, patients, and families. The symposium will close with a facilitated discussion where attendees in multiple disciplines will engage in dialog around translating HRQOL research into improved clinical outcomes.

Thursday, 2 June, 2016

AS3 – Eating, addiction and behaviour: A psychological perspective

AS3.01

Eating, addiction and behaviour: A psychological perspective

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Background. Food addiction is widely cited as an explanation for the obesity epidemic. However, the extent to which overeating is attributable to a diagnosable food-based addiction remains heavily debated. An alternative line of enquiry is to focus on dimensions of observable behaviour which underpin the tendency to overconsume palatable foods and drugs of abuse.

Objectives. This symposium will consider key similarities and differences between eating and substance use disorders from a psychological perspective. We will also examine the role of beliefs about “food addiction” in determining and shaping eating behaviour.

Results. First, we will consider the diagnostic instrument, the Yale Food Addiction Scale (YFAS). Using a systematic review of the literature, we conclude that there is little evidence to support whether so-called food addiction is sufficiently different to existing conditions and psychological traits to warrant classification as a distinctive disease. Second, we will argue that, like drugs of abuse, energy-dense foods have strong motivational value which depends on both state (e.g., deprivation state) and trait (e.g., obese versus lean differences) factors. It is therefore unsurprising that reward circuitry in the brain is activated following exposure to palatable foods. Third, based on a sample of psychiatric adolescent patients we delineate the psychiatric comorbidity of subjects with food addiction including a substantial overlap with eating disorders. Finally, we will consider the extent to which the food addiction concept may be harmful or helpful for dietary control and we will present recent data which indicate that believing oneself to be a food addict has a causal influence on eating behaviour.

Conclusions. Future directions for food addiction research and the implications for identification, prevention and treatment of problematic (over) eating behaviour will be discussed.

AS4 – Environmental Chemicals and Obesity: Focus on Mechanisms

AS4.01

Environmental Chemicals and Obesity: Focus on Mechanisms

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The current epidemic of obesity cannot be due to changes in genetics. It is also clear that while overeating and lack of exercise are important, they are not the only environmental factors leading to these global problems. The current approach of trying to “cure obesity” with drugs, diets and exercise is not working. Part of the problem is that these diseases/disorders likely have their origins during development: the Developmental Origins of Health and Disease. In addition, obesity is a disease that results from disruption of the endocrine mechanisms that control weight gain and metabolism. There are environmental chemicals that are endocrine disruptors: they disrupt hormone action. Some of these chemicals act on the tissues and pathways that control weight gain: they are called obesogens. This session will focus on three important basic pathways that control metabolism; stem cell differentiation, thermogenesis and brown fat, and hypothalamic control of appetite and satiety through case studies focused on the pesticide DDT, the antifouling agent and fungicide tributyl tin, and bisphenol A, the backbone of polycarbonate plastic. It will describe these pathways and indicate the current state of knowledge indicating that these pathways can be perturbed by obesogens leading to weight gain and altered metabolism. The fact that these important pathways are sensitive to disruption by environmental chemicals lends credence to the importance of environmental chemicals in the pathology of obesity. Since one can reduce exposure to environmental chemicals this obesogen hypothesis also shows a path to prevention of obesity by reducing exposures to these obesogenic chemicals during development and early childhood.

AS5 – Mobile and wireless technology (mHealth) to combat child and youth obesity: Exploring the scope for prevention and treatment

AS5.01

Mobile and wireless technology (mHealth) to combat child and youth obesity: Exploring the scope for prevention and treatment.

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Innovations in mobile and wireless technology (mHealth) provide a novel opportunity for combating child and youth obesity by promoting behaviour change for increased physical activity and healthy eating habits. Mobile technology is embedded in the daily life of most young people across a wide range of demographic and socioeconomic groups; therefore it might be an attractive intervention approach. Currently, the main trend is exploiting the pervasiveness of mobile technology and the ubiquitous connection to the Internet. Drawing on frameworks of health behaviour change, this can be encouraged through applying the most appropriate behaviour change techniques to interventions delivered via mHealth technologies. As for prevention of child and youth obesity, an important intervention strategy for obesity treatment through mHealth is allowing users

to monitor their behaviour. Data collected by mHealth devices could be shared with health professionals to individualise intervention strategies. The state of the art for devices monitoring physical activity is advanced and fitness trackers are popular. However, current technology does not provide effective solutions for monitoring eating habits besides mobile apps for self-reporting. Research is being conducted on integrating algorithms for automatic recognition of food through pictures to facilitate self-reporting. Other research explored new concepts for sensors that could objectively measure the meal and associated eating behaviour (e.g., smart forks and dishes). Recent developments in mobile technology also allow providing personalised, continuous and context-aware feedback on behaviour. Individualised feedback might make it more likely for young people to continue the intervention. Gamification and serious games are two mHealth technologies, which appear particularly effective in young people. However, research is needed on procedures for the integration of behaviour change techniques in apps or games, and on their effectiveness in young people. Despite the great potential of mHealth technology as intervention strategy for prevention and treatment of obesity, there are several barriers for the effective use of mHealth technology. For example,

- Competing interests of young people including peer pressure, family habits and environment
- Health inequality in areas of social and economic deprivation in co-existence with disengagement from health services, low literacy and access to mHealth Technologies
- Mismatch of the speed of technological developments and the generation of effectiveness evidence for mHealth interventions
- Imbalance between the advancement of technology and the cost of new technology to be rolled out
- Ethical concerns related to data security, monitoring and safety against (cyber) bullying and exploitation, use of persuasive techniques in a vulnerable population, and withdrawal of social and behavioural support mechanisms after obesity programme completion.

To empower mHealth technologies as a tool for obesity prevention and treatment, medical research should develop long-term partnerships between schools, communities, academia and industry. This will enable on-going access to young people in need of support, and the ability to have on-going research capabilities, which will allow mHealth interventions to evolve over time, allowing for evaluation of this technology, procedures and practice. Consequently, pathways for implementation of mHealth interventions into standard care need to be developed.

Acknowledgements: The speakers and the chair are consortium members of the Pegaso Fit For Future project which is funded by the European Commission FP7 Framework (FP7-ICT-2013-10).

Friday, 3 June, 2016

AS7 – Interactions of individual and contextual factors related to obesity – related behaviours and obesity in Europe

AS7.01

Interactions of individual and contextual factors related to obesity-related behaviours and obesity in Europe

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Description: The social and physical environment encompasses a range of characteristics that are likely to influence obesity-related behaviours (such as physical activity, sedentary behaviour and eating habits) – and

thereby weight status. The SPOTLIGHT project has recently conducted a large five-country-European survey and street audit in urban neighbourhoods stratified by residential density and socio-economic status. This symposium describes innovative approaches and novel associations, including individual barriers towards healthy eating, patterns of potentially obesogenic environments in European adults and complex modelling of interactions of individual-level and contextual factors in relation to behaviours and obesity. The results are placed in the context of existing evidence in this field, and we will share the lessons that may be of relevance for policy, practice and further research.

Funding: Research of the SPOTLIGHT project relating to these abstracts was funded by the Seventh Framework Programme (CORDIS FP7) of the European Commission, HEALTH (FP7-HEALTH-2011-two-stage).

AS8 – Long term health consequences of childhood obesity

AS8.01

Long term health consequences of childhood obesity

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Background: Body size at different points across the life-course has associations with many forms of cancer. The majority of these studies focus on two periods-notably birth and adult ages. Studies with a focus on childhood have, until recently, been lacking in the literature.

Objectives: To provide an overview of the early life origins of cancer from an epidemiological perspective.

Results: An overview of the international literature with a focus on early life will be provided. Published and unpublished results from the project childgrowth2cancer, which is largely based upon information from the Copenhagen School Health Records Register will be presented. This register, which includes 372,636 children born from 1930–1989, is one of the few resources in the world that can support investigations into associations between measured childhood body size and growth with the outcome of cancer.

Conclusions: This review session will provide an up-to-date overview of research in the field of early life origins of cancer and discuss the implications that these results have in light of the international levels of excess adiposity in children.

AS9 – EveryBODY Matters: Addressing weight stigma in research, practice, and policy

AS9.01

EveryBODY Matters: Addressing weight stigma in research, practice, and policy

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Description: Weight stigma, referring to when body size is devalued in a social context, has increased in frequency and intensity over the last few decades. A growing body of literature points to the prevalence of weight stigma in media, employment, educational and healthcare settings, and in interpersonal relationships. Being on the receiving end of weight stigma

can increase vulnerability to anxiety, stress, depression, suicidal thoughts and behaviors, avoidance of physical activity, disordered eating habits and avoidance of the healthcare system. Reducing weight stigma is therefore an important goal not only among health professionals but in broader society. The objectives of this symposium are: 1) to present evidence regarding the negative health consequences of weight stigma and how research, practice, and policy can perpetuate societal weight stigma; 2) to share current research and initiatives that address weight stigma among healthcare professionals, researchers and policy makers; 3) to outline practical strategies on how to best address weight stigma through research, practice, and policy (4) to argue for a greater focus on interdisciplinary collaborative professional development in the area of weight stigma. Previous symposia facilitated by, and indeed research conducted by, the team has emphasized the importance of engaging and supporting participants as they deal with this sensitive, value-laden, and often personal, issue. Therefore, to help participants engage, we will employ a variety of presentation formats including listening to personal accounts, reflecting on our own attitudes, showcasing images and videos, and providing a 'safe space' to ask questions and discuss. Participants will also help to inform the development of a comprehensive and interdisciplinary weight stigma strategy for the future.

AS10 – Prevention of type-2 diabetes in overweight and obese – first results from the large PREVIEW Project

AS10.01

PREvention of type-2 diabetes (T2D): Why is the PREVIEW project important? Comparison with previous T2D prevention studies

Raben, A.

University of Copenhagen, Denmark

Previous diabetes prevention studies have shown that weight loss through lifestyle intervention is an efficient tool for preventing T2D. However, several questions on specific life style factors still remain unanswered. The main aim of the PREVIEW project is to identify the most successful combination of diet (protein, glycemic index) and physical activity as well as the role of sleep, stress and behavioral factors for the prevention of T2D in pre-diabetic overweight children and adults. Both a large RCT ($n \approx 2,500$) and several population studies are used to answer our research questions.

AS10.02

The PREVIEW intervention study: How does 8-weeks weight loss and 4 mths weight maintenance phase influence T2D risk factors?

Fogelholm, M.

University of Helsinki, Finland

After pre-screening about 15,600 and screening about 5,500 subjects, a total of 2,214 pre-diabetic overweight adults started the initial 8-weeks weight reduction phase. Mean weight loss was 11.2 kg or 10.8% of baseline body weight. A total of 83% reached >8% weight loss and could continue in the 3-y weight maintenance intervention phase. We will report how well the weight loss was maintained for the first 4 months and how the changes in weight was related to selected clinical outcomes (e.g. glucose, insulin, HbA1c).

AS10.03

PREvention of type-2 diabetes and brain food-reward activity

Westerterp-Plantenga, MS.; Drummen, M.; Adam, T.

University of Maastricht, the Netherlands

Insulin receptors are widely distributed throughout the body and the brain. In the brain, insulin does not only have implications for homeostatic food intake regulation, but was also shown to be an important signal for food reward perception. While the relationship between peripheral and central insulin sensitivity is not fully established, disturbed insulin signaling may contribute to altered brain responses in overweight and obese subjects with impaired insulin sensitivity.

AS10.04

PREvention of type-2 diabetes in overweight and obese adolescents: Associations with gender, puberty stage and body composition

Westerterp-Plantenga, MS.; Dorenbos, E.; Vreugdenhil, A.

University of Maastricht, the Netherlands

Adolescents show a transient insulin resistance during puberty. Overweight and obese adolescents are at risk for sustained insulin resistance and consequently, for developing type-2 diabetes later in life. The PREVIEW intervention study aims to identify the most effective lifestyle components to prevent type-2 diabetes in these overweight adolescents. Cross-sectionally, we showed that at baseline, gender, puberty stage, BMI z-score and fat mass were independent contributors to insulin sensitivity in overweight and obese adolescents.

AS10.05

PREvention of type-2 diabetes and the role of protein: Evidence from population-based studies in PREVIEW

Sluik, D.; Feskens, E.

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In contrast to intervention studies, a high protein intake is associated with a higher risk of type-2 diabetes in observational studies. We studied the association between total protein intake and diabetes in the New Zealand Adult Nutrition Survey, Quebec Family Study (Canada), Cardiovascular Risk in Young Finns Study (Finland), NQplus (the Netherlands) and Lifelines (the Netherlands). Combining these five cohorts, an increased protein intake was indeed related to higher odds of having diabetes.

AS10.06

PREvention of type-2 diabetes: Importance of psycho-social variables beyond diet and physical activity

Schlicht, W.; Hansen, S.; Thurn, J.

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Psycho-social constructs such as sex, age, education, self-efficacy or habits have been shown to promote or hinder behaviour change and thus the prevention of T2D. Different constructs are described and analysed at baseline and after the 8-week LCD period by different statistical methods. It is hypothesised, that these constructs represent the participant's "disposition" or psycho-social "readiness" for the behaviour change process of the lifestyle intervention according to the PREVIEW study protocol.

ORAL SESSIONS

Wednesday, 1 June, 2016

OS1 – Oral Session: Prevention and Behaviour

OS1.01

Maternal sense of coherence and controlling feeding practices: The importance of resilience and support for families with preschoolers

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Stress, and the responses it elicits, is central to decision-making and emotional wellbeing throughout a person's life. Antonovsky's theoretical formulation of the Sense of Coherence (SOC) has been associated with individuals' ability to cope with stress. Comprised of three interrelated subscales – comprehensibility, manageability, and meaningfulness – the SOC questionnaire measures an individual's orientation toward her/his capacities, environment, future, and life. Specifically, comprehensibility measures the person's sense that her/his own life is ordered and understandable; manageability measures the person's perception that resources and skills to manage stressors are readily available; and meaningfulness measures the person's overall sense that life is filled with meaning and purpose, and that it is, therefore, worthwhile to manage stressors. The study is the first to analyze associations between parental SOC and controlling feeding practices. The study aims to examine the validity of the SOC 13-item questionnaire (SOC-13), associations between SOC and maternal and child characteristics, and associations between SOC and use of pressuring or restrictive feeding, among mothers of 4-year-olds. 565 mothers (23.5% of foreign origin, 30.3% with overweight/obesity) recruited via the Swedish population registry (response rate: 65%), completed the SOC-13, the Child Feeding Questionnaire (CFQ) and a **background** questionnaire. The validity of SOC-13 was examined using confirmatory factor analysis; associations with **background** characteristics and feeding practices were tested with structural equation modeling. SOC-13 validity testing showed acceptable fit (TLI = 0.93, CFI = 0.94, RMSEA = 0.06, SRMR = 0.04) after allowing one pair of error terms to correlate. SOC increased with mothers' Swedish **background** and level of education, and decreased with higher BMI. Child characteristics were not associated with SOC. Lower SOC was associated with controlling feeding practices and with concern about child weight and eating. In conclusion, resilience to stress may reduce the likelihood that mothers would engage in counterproductive practices, such as restrictive or pressuring feeding, even in the presence of concern about the child's weight. The links between SOC and feeding practices suggest that SOC-related parameters can inform studies on childhood obesity prevention, and that obesity programs should address the structural barriers that parents face in building resilience to stress.

OS1.02

The role of adiposity in perceived ability within Ireland's primary education system

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Background: In educational institutions, "obesity stigma" may be interpreted as a tendency to discount the ability and/or achievements of overweight or obese students or to extend active discrimination in terms of giving less attention to obese children or lower marks in exams almost as a way of punishing them for being obese. The stigmatization of obese individuals is documented in the literature as having variations in the degree and nature of stigmatization related to gender.

Methods: Using the first wave of the Growing Up in Ireland Survey we examined whether a teacher's assessment of their pupil's academic ability was influenced by: the child's; the child's primary caregiver and both child and the child's primary caregiver body mass index (BMI). Multivariate regression analyses of the teacher's assessment, controlling for the child's actual test performance, its BMI and month of birth, as well as its primary caregiver's BMI, religion, marital status, equivalised household income and educational attainment were undertaken. Separate analyses examined assessments in respect of mathematics and reading and adjustments made for within school clustering effects.

Results: Data on 6,363 children were analysed. The study found that those children whose primary caregiver is overweight or obese were more likely to be predicted to be in the average and below average quintile for maths and reading compared to those whose primary giver was leaner when other variables were controlled. Variations in predicted ability related to gender were found – females being predicted to have lower maths but higher reading ability, primary caregiver's marital status, income and education.

Conclusions: This study demonstrates that predicted ability is a function of factors including primary caregiver's adiposity, marital status, income and education as well as the child gender. These findings warrant close scrutiny given the potential repercussions for educational attainment in a system where teachers are involved in grading their pupils in State exams.

OS1.03

The longitudinal relation between accumulation of adverse life events and body mass index from early adolescence to young adulthood

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²Netherlands Interdisciplinary Demographic Institute (NIDI-KNAW), The Hague, the Netherlands

Background: Adverse life events, such as disease or death of a family member and parental divorce, can cause weight changes through behavioral and biological mechanisms. **OBJECTIVE:** To establish whether the accumulation of adverse life events is related to body mass index (BMI) across multiple time points from early adolescence to young adulthood.

Methods: Data are from 2188 children participating at T1 (10–12 years), T3 (14–18 years) and/or T5 (20–23 years) of the prospective TRAILS (TRacking Adolescents' Individual Lives Survey) cohort study. Adverse events before T1 and between T1, T3 and T5 were measured with a parent interview at T1 and a semi-structured interview (Event History Calendar) with the adolescent at T3 and T5. An adverse events score was calculated per wave. BMI z-scores were determined from objectively measured height and weight using the LMS reference curves of the International Obesity Task Force for children < 18 years. A modified autoregressive

cross-lagged structural equation model, adjusted for age, gender and parental socio-economic status (SES), was used to test the relation between adverse events and BMI.

Results: Children experienced on average 2.4 events at T1 and 6.0 events at T3 and T5. At T1 and T3, approximately 15% had overweight/obesity. At T5, 21% was overweight and 7% was obese. Model fit was good (RMSEA: 0.019, CFI: 0.996, TLI: 0.990). Significant tracking of adverse events and BMI was found. Further, adverse events before T1 and between T3 and T5 were related to BMI at T5 ($\beta = 0.06$, $p = 0.001$ and $\beta = -0.04$, $p = 0.04$, respectively). Health events before T1 were responsible for a higher BMI and events related to relationships and victimhood events between T3 and T5 were responsible for a lower BMI at T5.

Conclusion: Accumulation of adverse relationship and victimhood events in their recent past negatively influenced young adults BMI, while accumulation of adverse health events during childhood were related to higher BMI in young adults.

OS1.04

Effects of active commuting or leisure time exercise on health-related quality of life in overweight men and women

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Background: Globally, one third of the adult population does not achieve the recommended levels of physical activity, and physical inactivity and excess body weight are leading risk factors for lifestyle related diseases and premature death. Moreover, physical activity can improve both physical and mental health and wellbeing, e.g. health-related quality of life (QOL). However, the relative effects of different exercise exposures on QOL are not clearly established in overweight subjects. In an ongoing trial we investigated the effects of 3 months of active commuting and leisure time exercise on health-related QOL in overweight men and women.

MATERIALS- Methods: In total, 94 overweight (BMI: 25–35 kg/m²), younger (20–45 y), sedentary male ($n = 51$) and female ($n = 43$) subjects were randomized to active commuting (BIKE, $n = 19$ completers), leisure time exercise of moderate (MOD, ~50% VO₂maxR, $n = 28$ completers) or vigorous intensity (VIG, ~70% VO₂max R, $n = 26$ completers) or control (CON, $n = 15$ completers). Subjects were to exercise 5 days/week corresponding to a weekly exercise dose of 2100 kcal in men and 1600 kcal in women. Self-rated health QOL was assessed at baseline and 3 months with the Short Form 36-item Health Survey Questionnaire (SF-36).

Results: There were no between-group differences at baseline or 3-month in the subscales of SF-36. However, VIG improved physical function ($p = 0.037$), general health ($p = 0.040$), vitality ($p = 0.002$) and mental health ($p = 0.007$) and MOD improved physical function ($p = 0.002$). No changes occurred in BIKE or CON. Females had lower social function and mental wellbeing compared to males at baseline ($p = 0.045$; $p = 0.018$) and after 3 months ($p = 0.003$; $p < 0.001$).

Conclusions: Three months of leisure time exercise, as opposed to active commuting, improve components of physical and mental health in overweight men and women. Future studies should address possible gender effects. Conflicts of interest: The authors declare no conflicts of interest. Funding: The project was carried out as a part of the research programme “Governing Obesity” (<http://go.ku.dk/>) and funded by the University of Copenhagen Excellence Programme for Interdisciplinary Research (<http://research.ku.dk/strengths/excellence-programmes/>) and by the Danish foundation TrygFonden (<http://www.trygfonden.dk/Om-Tryg-Fonden/In-English>).

OS1.05

A proportionate intervention in school led to improve overweight prevention without aggravating the health social inequalities

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Background & aims: A structured screening strategy led to a significant decrease in overweight and obesity prevalence [1]. Inverse relationship between income and the prevalence of obesity is known. Furthermore, public health interventions may increase health inequalities. In this context, the PRALIMAP-INÉS trial was implemented between 2012 and 2015 and aimed to investigate whether a strengthened care management strategy to prevent and reduce overweight could have an equivalent effect on individuals of lower socioeconomic status relative to those of higher socioeconomic status.

Methods: After a medical examination carried out in 36 schools in Lorraine (north-eastern France), 8734 adolescents were measured and 1639 with overweight and/or android distribution of adiposity (BMI thresholds according to IOTF; waist circumference or WC according to McCarthy's threshold) were included. All adolescents filled validated questionnaires estimating socioeconomic, psychological and lifestyle's behaviour characteristics (Family Affluence Scale or FAS; EAT-26; IPAQ; HAD). All had access to 5 group sessions. 698 adolescents included were less socially advantaged (FAS ≤ 5). They were randomised in two groups, including one group (INES = 470 adolescents) that was proposed for additional activities (motivational interviews, food workshops, physical activity coaching, financial support for sport equipment, advice in a specialized hospital for obesity).

Results: Inclusion data confirmed the existence of a social gradient (across five FAS categories) correlated to BMI z-score ($P = 0.05$), BMI ($P = 0.002$) but not with WC ($P = 0.07$). After interventions, BMI and BMI z-score were less influenced by social inequalities ($P = 0.003$ and $P = 0.04$, respectively) (figure 1). By comparing advantaged group and INES group, changes for various criteria were non-inferior (BMI, WC, global physical activity, bulimia score) or equivalent (BMI z-score, restriction score, HAD score).

Conclusion: These results confirm the strong social gradient of obesity. While a universal approach to prevent obesity remains uncertain, this school-based and proportionate intervention seems effective and improve adhesion among disadvantaged adolescents through appropriate activities. The school environment is a good setting for improve health without aggravate the social inequalities in health.

Program funded by INCA – Call of proposals 2011: Interventional research aiming to reduce inequalities in relation to cancer

Reference:

1 Bonsergent E, et al. Am J Prev Med. 2013; 44(1):30–39.

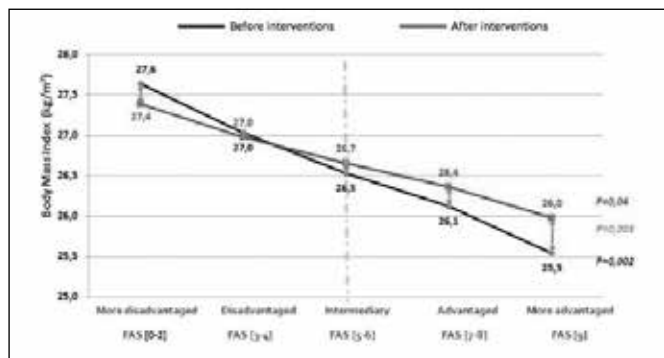


Fig. 1. BMI progression regarding FAS scores

OS1.06

Primary prevention of childhood obesity within child health services: The PRIMROSE cluster-RCT

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Objective: The objective was to evaluate a manualized theory-driven primary preventive intervention aimed at early childhood obesity. The intervention was embedded in Swedish child health services, starting when eligible children were 9–10 months of age, and continuing until the children reached the age of four.

Methods: Child health care centres in eight Swedish counties were randomized into intervention and control units and included 1355 families with 1369 infants. Over approximately 39 months, families in the intervention group participated in one group session and eight individual sessions with a nurse trained in motivational interviewing, focusing on healthy food habits and physical activity. Families in the control group received care as usual. Primary outcomes were children's body mass index, overweight prevalence, and waist circumference at age four. Secondary outcomes were children's and mothers' food and physical activity habits and mothers' anthropometrics. Effects were assessed in linear and log-binominal regression models using generalized estimating equations.

Results: There were no statistically significant differences in children's BMI ($\beta = -0.11$ [95% CI: -0.31; 0.08]), waist circumference ($\beta = -0.48$ [95% CI: -0.99; 0.04]) and prevalence of overweight (RR = 0.95 [95% CI: 0.69; 1.32]). No significant intervention effects were observed in mothers' anthropometric data or regarding mothers' and children's physical activity habits. There was a small intervention effect in terms of healthier food habits among children and mothers.

Conclusion: There were no significant group differences in children's and mothers' anthropometric data and physical activity habits. There was, however, some evidence suggesting healthier food habits, but this should be interpreted with caution.

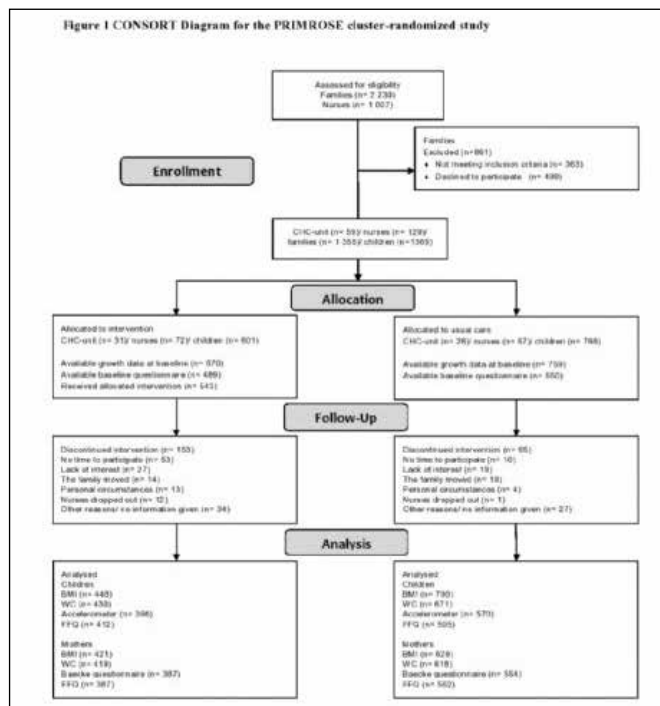


Fig. 1. CONSORT Diagram for the PRIMROSE cluster-randomized study

OS1.07

Parental Perception of Child Weight Status and Weight Gain across Childhood

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Background and Objectives: Parents of children who are overweight often fail to accurately identify their child's weight status and although these misperceptions are presumed to be a major public health concern, no research has examined this presumption. Our objective was to examine whether parental perceptions of child weight status are associated with weight gain across childhood. More specifically, we aimed to answer the question; if parents do not recognize that their child is overweight, does this result in their child being more likely to continue to gain weight?

Methods: Data from the Longitudinal Study of Australian Children were used to assess parental perceptions of child weight status and to examine changes in researcher measured child BMI-Z scores across childhood, from 4 to 13 years old. 3,557 Australian children and their parents participated.

Results: Children whose parents perceived their weight as being 'overweight', as opposed to 'about the right weight', gained more weight (increase in BMI-Z score) from baseline to follow up in all analyses. This finding did not depend on the actual weight of the child; the association between perceiving one's child as being overweight and future weight gain was similar among children whose parents accurately and inaccurately believed their child was overweight.

Conclusions: Contrary to popular belief, parental identification of child overweight is not protective against further weight gain. Rather, it is counter-intuitively associated with more weight gain across childhood. One potential explanation of this finding is the stigma attached to the label of being 'overweight'. Further research is needed to understand how parental perceptions of child weight may counter-intuitively contribute to obesity.

Accuracy of weights and heights, self-reported on-line by young adults

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Background and AIMS: Using conventional approaches, self-reported weights are commonly under-reported, and heights over-reported, in adults over 18 years old. On-line collection of anthropometric data is increasingly popular for research, being convenient and low-cost, but evidence on reliability is limited. **OBJECTIVE:** To validate on-line self-reported heights and weights, against objectively measured data.

Material/Methods: Young adults (age 18–24) studying in a large urban university were invited to participate in an on-line lifestyle survey. Self-reported heights and weights were validated using two methods; 1) measurements recorded in medical records, by primary-care clinic staff: self-reported and anthropometric measures were both collected within four weeks of each other; 2) measurements by a trained researcher within two weeks of the survey administration. Data were analysed to identify characteristics associated with misreporting.

Results: From a total of 23,010 young adults invited, 5,505 (24%) provided on-line data, mean age = 19.2 (SD3.2). Measured data were retrieved from medical records for 5,105. Both self-reported and measured data were available for 1,443 individuals (547 men, 896 women, mean age 19.2SD2.6), with 1,278 validated from medical records and 165 by researcher-measurements. Intra-class correlations between self-reported and measured parameters were: weight ($r = 0.99$), height ($r = 0.98$), with good agreements between measured and self-reported weight, height and BMI using Bland & Altman analysis. Self-reported weight was underestimated uniformly across BMI, gender and ethnicity, by a mean -0.4 (SD 0.37)kg, ($p < 0.001$). Height was accurately reported overall across BMI and gender, mean height for both self-reported and measured = 1.72 (SD 0.01)m, $p = 0.783$. Discrepancies between methods caused misclassification of BMI category for 17 participants.

Conclusion: On-line reporting of heights and weights are generally reliable. About a quarter of young adults approached under anonymised online conditions are willing to provide anthropometric data, with only minor mis-reporting errors.

OS2 – Adipose Tissue Metabolism

Fatty acids intakes are associated with higher apelin gene expression in visceral and subcutaneous adipose tissues

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Background & AIM: Apelin, one of the most recently identified adipokines, increased in adipose tissue and plasma with obesity, has been identified as a new player in the control of glucose homeostasis. The objective of the present study was to investigate the association between the apelin gene expression and habitual fatty acids intake.

Material/Methods: Visceral and subcutaneous adipose tissue were obtained from 32 morbid obese and 32 non-obese age- and sex-matched subjects, who underwent open abdominal surgery. Dietary intake was collected using a valid and reliable food frequency questionnaire, and daily intake of fatty acids was calculated. The mRNA expression of apelin gene

in visceral and subcutaneous adipose tissues were analyzed by Real-Time PCR.

Results: The mean age was 39.6 years for both groups and body mass index for morbid obese and non-obese subjects was 45.3 and 25.6 kg/m², respectively. Apelin gene expression was more increased in morbid obese than non-obese subjects in both subcutaneous (3.42 vs 0.49, $P < 0.05$) and visceral adipose (3.65 vs 0.19, $P < 0.05$) tissues. Apelin expression in visceral adipose tissue among non-obese subjects was correlated with percentage of total fatty acids ($\beta = 0.413$, $P = 0.019$), saturated fatty acids ($\beta = 0.379$, $P = 0.032$), and monounsaturated fatty acids ($\beta = 0.349$, $P = 0.032$); however, among morbid obese subjects, total fatty acids ($\beta = 0.612$, $P < 0.001$), polyunsaturated fatty acids ($\beta = 0.376$, $P = 0.034$) and cholesterol intake ($\beta = 0.353$, $P = 0.047$) was correlated with visceral adipose tissue. Moreover, we found significant correlations between apelin expression in subcutaneous adipose tissue and total fatty acids in both morbid obese ($\beta = 0.610$, $P < 0.001$) and non-obese ($\beta = 0.457$, $P = 0.010$) subjects.

Conclusions: Increased apelin gene expression in adipose tissue is linked to total dietary fatty acids intake in both morbid and non-obese subjects, suggesting an important role of lipogenic pathways in the causal relationship between consequences of excess fat intake and the development of obesity.

Acknowledgement: The authors would like to thank Dr Ebrahimi for surgical procedures.

Conflict of interest: None of the authors have any personal or financial conflict of interest.

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Mitochondrial oxidative pathways are downregulated in adipocytes in obesity – a study of young healthy MZ twins

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Background and Aims: Low mitochondrial activity in adipose tissue is suggested to be an underlying factor in obesity and its metabolic complications. It is still unknown however, whether this is due to malfunction of adipocytes or of other cells in adipose tissue.

Methods: We studied young adult monozygotic (MZ) twin pairs discordant ($n = 14$, intrapair difference $\Delta\text{BMI} > 3 \text{ kg/m}^2$) and concordant ($n = 5$, $\Delta\text{BMI} < 3 \text{ kg/m}^2$) for BMI identified from ten birth cohorts of 22–36-year-old Finnish twins. Abdominal body fat distribution (MRI), liver fat content (MR spectroscopy), insulin sensitivity (OGTT), hsCRP, lipids and adipokines were measured. Subcutaneous abdominal adipose tissue biopsies were obtained to analyze the transcriptomics patterns (Affymetrix U133 Plus 2.0 chips) of the isolated adipocytes, as well as of the whole adipose tissue. MtDNA transcript levels in adipocytes were measured by qRT-PCR.

Results: The heavier ($\text{BMI } 29.9 \pm 1.0 \text{ kg/m}^2$) co-twins of the discordant pairs had significantly more subcutaneous, intra-abdominal and liver fat and were more insulin resistant ($P < 0.01$ for all measures) than the leaner ($24.1 \pm 0.9 \text{ kg/m}^2$) twins. A total of 2538 genes in adipocytes and 2135 in adipose tissue were significantly differentially expressed between the co-twins. Pathway-analysis of these transcripts revealed reduced expression of mitochondrial pathways in isolated adipocytes and adipose tissue of the heavier co-twins. Consistently upregulated genes in these co-

twins were related to inflammation in isolated adipocytes and consistently downregulated genes to mitochondria in adipocytes and adipose tissue. Mitochondrial DNA transcript levels (12S RNA, 16S RNA, COX1, ND5, CYTB; qRT-PCR) and a major mitochondrial regulator PGC-1 α were reduced in the heavier co-twins' adipose tissue and adipocytes. **Conclusion:** Subcutaneous abdominal adipocytes in obesity show global expressional downregulation of oxidative pathways, reduction in the level of mitochondrial transcripts and upregulated inflammatory pathways, associated with metabolic alterations of obesity.

OS2.03

Environmental factors associated with overweight or obesity development in children in school age in Botucatu, São Paulo, Brazil

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Childhood obesity has become a public health problem and presents multifactorial causes. The objective of this study was to investigate the influence of environmental factors on the development of overweight or obesity in children in fundamental school age.

Methodology: Two groups of children were assessed: group 1 (G1), composed of children with overweight or obesity and group 2 (G2), composed of eutrophic children. The students (n = 102) were from public school in the city of Botucatu, São Paulo, Brazil. To determine the nutritional status, it used the Body Mass Index (BMI) for age and sex, marked on growth charts. The cutoff values used were those recommended by WHO percentiles 85 and 95 for overweight and obesity, respectively. Data about children's life style and on familiar characteristics, included nutritional status of the parents, were obtained. The test T-student and $p < 0,05$ were used in the comparison of the groups.

Results: Children in both groups had an average of 10 years old. The mean values of weight and height to groups 1 and 2 were $82.0 \text{ kg} \pm 7.5 \text{ kg}$; $158 \text{ cm} \pm 5.2 \text{ cm}$; $157 \text{ cm} \pm 0,07 \text{ cm}$; $157 \text{ cm} \pm 0,06 \text{ cm}$, respectively. When analyzed the environmental factors, statistically significant difference were identified between the practice of physical activity outside school hours of time watching television and the number of siblings ($p = 0.01$). As for the type of transport used to go to school it can be seen that the most used by both the G1 and G2 by, was the bus, 67% and 89%, respectively; and few children usually go walking to school, 4% and 1%, respectively. There was higher percentage of parents with excess body weight in the G1 (34% \times 25%). Many of the risk factors that appear to contribute to the development of overweight or obesity in children are also presented in the scientific literature.

Conclusion: lesser physical activity and the family profile were identified as determinants factors to development of excess of weight in the population of children; however more comprehensive studies are needed which consider besides environmental factors, those involving children's nutrition and their family.

OS2.04

Functional characterization of novel cytoskeletal protein SEPT11 in murine and human adipocytes: Role in lipid traffic

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Introduction: The cytoskeletal proteins, actin, tubulin and vimentin, play important roles in the regulation of adipocyte differentiation and response to insulin. Recently, septins have been proposed as the fourth component of the cytoskeleton. However, these proteins have not been characterized as yet in adipose tissue. In this work, we examined the cellular, molecular and functional features of a member of this family, septin 11 (SEPT11), in adipocytes and evaluated the impact of obesity on the expression of this protein in human adipose tissue.

Methods: Gene and protein expression levels of SEPT11 were analysed in human adipose tissue samples. SEPT11 distribution was evaluated by immunocytochemistry, electronic microscopy and subcellular fractionation techniques. GST-pull down, immunoprecipitation and a Yeast-Two Hybrid screening were used to identify the SEPT11 interactome. Gene silencing was used to assess the role of SEPT11 in the regulation of insulin signalling and lipid metabolism in adipocytes.

Results: SEPT11 is expressed in human adipocytes and its levels increased in both omental and subcutaneous adipose fat, with the former depot exhibiting higher overall transcript levels (1.0 ± 0.0 vs. 5.7 ± 1.3 A.U., $P < 0.0001$), SEPT11 mRNA content positively correlating with parameters of insulin resistance in subcutaneous fat. In non-stimulated adipocytes, SEPT11 immunoreactivity showed a ring-like distribution at the cell surface that was associated to caveolae. Biochemical analyses showed that SEPT11 interacted with the main component of caveolae, caveolin-1 (CAV1) as well as with the fatty acid-binding protein, FABP5. Notably, the three proteins redistributed and co-localized at the surface of lipid droplets upon exposure of adipocytes to oleate. In this line, SEPT11 silencing in 3T3-L1 adipocytes impaired insulin signalling and decreased insulin-induced lipogenesis.

Conclusions: Our findings demonstrate that SEPT11 is a novel component of the adipocyte cytoskeleton that plays an important role in the regulation of lipid traffic and metabolism in this cell type through its interaction with both CAV1 and FABP5. Conflict of Interest: None Disclosed

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OS2.05

Understanding extracellular and intracellular mediators in subcutaneous and omental adipose tissue related to obesity and insulin resistance

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Introduction: Adipose tissue expansion in obesity requires a well-balanced adaptive response of its cellular and extracellular compartments. Alterations in the extracellular matrix (ECM) and/or the capacity of adipocytes for lipid storage and mobilization have been linked to obesity-associated insulin resistance (IR). Identification of the factors governing these processes and their specific impact on fat depots seem essential for better understanding the pathophysiology of obesity and metabolic disease. **Objectives:** To identify intracellular and extracellular biomarkers of subcutaneous (SC) and omental (OM) fat driving the transition to IR in obesity.

Material/Methods: 2D-DIGE for comparative proteomics of SC and OM fat from lean and obese subjects [sub-classified by HOMA-IR and HbA1c as normoglycemic (NG) or IR]. Immunoblotting, biochemical assays, and

confocal microscopy were employed to investigate the molecular changes occurring in obese adipose tissue in IR.

Results: Our multi-comparative proteomic analysis of adipose tissue revealed changes in the ECM components, collagen-VI and lumican, in lean vs. obese and/or IR vs. NG obese subjects. Both OM and SC fat exhibited increased collagen fibers under IR, although collagen isoforms and lumican were differentially regulated in the two depots. IR was associated with higher pericellular fibrosis in OM fat and increased adipocyte size in SC fat. Lower content of integrin beta-1, decreased insulin signalling, and impaired levels of enzymes regulating glucose metabolism were observed in IR vs. NG SC fat. OM fat in IR exhibited increased levels of GDI2, which negatively regulates lipid metabolism through its inhibitory action on lipid droplet-associated proteins.

Conclusions: Our data suggest that both SC and OM fat contribute to the development of IR in obesity, through both common and distinct molecular pathways. IR is associated with increased pericellular fibrosis in OM fat, while unbalanced regulation of ECM components and impaired cell-ECM interactions seem to occur in IR SC fat. Likewise, metabolic dysfunction of adipose tissue in IR comprises both decreased carbohydrate metabolism in SC fat and impaired management of intracellular lipids in OM fat.

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OS2.06

Cell-autonomous brown-like adipogenesis of preadipocytes from retinoblastoma haploinsufficient mice

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Background & AIMS: Mechanisms behind the emergence of brown adipocyte-like (brite or beige) cells in white fat (WAT) are of scientific and clinical interest. The origin of these cells in WAT is unclear. Retinoblastoma protein gene (Rb) haploinsufficiency associates in mice with improved metabolic regulation linked to a greater capacity for fatty acid oxidation and thermogenesis in WAT [1,2]. This model could be useful for further characterization of brite/beige fat cell precursors.

Objective: To identify a feasible mechanism of WAT-to-BAT remodeling in this model.

Material/Methods: Differentiated primary adipocytes and Sca1-positive preadipocytes derived from adipose depots of Rb(+/-) mice and wild-type siblings were compared.

Results: Primary white Rb(+/-) adipocytes displayed under basal conditions increased glucose uptake and an enhanced expression of brown adipocyte-related genes (Pparg, Ppargc1a, Ppargc1b, Prdm16, Cpt1b), but not of purported beige/brite transcriptional markers (Cd137, Tmem26, Tbx1, Slc27a1, Hoxc9, Shox2). Lack of induction of beige markers phenocopied results in WAT of adult Rb(+/-) mice. Flow cytometry analysis evidenced an increased number of preadipocytes in WAT depots of Rb(+/-) mice. Sca1-positive preadipocytes from WAT of Rb(+/-) mice displayed increased gene expression of several transcription factors common to the brown and beige adipogenic programs (Prdm16, Pparg, Ppargc1a) and of receptors of bone morphogenetic proteins (BMPs); however, amongst the recently proposed beige markers, only Tbx1 was upregulated. Adult Rb+/- mice had increased circulating levels of BMP7.

Conclusion: Preadipose cells resident in WAT depots of Rb(+/-) mice retain an increased capacity for brown-like adipogenesis that appears to be different from beige adipogenesis. The contribution of these precursors to the Rb(+/-) adipose phenotype is driven, at least in part, by interaction with BMP7 pathways [3].

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OS2.07

Exercise training-induced effects on abdominal subcutaneous adipose tissue gene and protein expression and adipose tissue morphology in obese humans

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Objective Rodent studies have indicated that physical exercise may improve adipose tissue function. We investigated the effects of a 12-week supervised, progressive exercise training program on markers related to abdominal subcutaneous adipose tissue function, as well as adipose tissue morphology in well-phenotyped, metabolically healthy compared to metabolically compromised obese subjects.

Methods: 21 obese men (14 metabolically compromised (non-alcoholic fatty liver and/or type 2 diabetes) and 7 controls) participated in a 12-week supervised, progressive, combined exercise-training program. At baseline and after intervention, abdominal subcutaneous adipose tissue biopsies were collected to determine adipokine expression and gene expression of markers for lipolysis, inflammation, browning and mitochondrial biogenesis/function by means of RT-PCR. Furthermore, Western Blot analyses were performed to quantify protein expression of mitochondrial oxidative phosphorylation (OXPHOS) complexes, and adipocyte size was determined.

Results: At baseline, subcutaneous adipose tissue gene expression of HSL ($P = 0.005$), CGI-58 ($P < 0.001$) and PGC-1 α ($P = 0.037$) as well as peripheral ($P < 0.001$), hepatic ($P < 0.001$) and adipose tissue insulin sensitivity ($P = 0.048$), fasting plasma glucose ($P = 0.009$) and HOMA-IR ($P < 0.002$) were significantly lower in the metabolically compromised as compared to metabolically healthy subjects. Furthermore, total OXPHOS protein content and mean adipocyte diameter were comparable between groups. The exercise training program, which increased maximal aerobic capacity ($P < 0.001$) and muscle strength ($P < 0.001$) and slightly reduced body fat mass ($P = 0.021$), did not affect abdominal subcutaneous adipose tissue gene expression of markers for mitochondrial biogenesis and function, browning, lipolysis, inflammation and adipokines, irrespective of baseline metabolic status. Moreover, total OXPHOS protein content and mean adipocyte diameter remained unchanged after the training program ($P = 0.789$, $P = 0.744$, respectively). **Conclusion:** A 12-week supervised, progressive exercise-training program did not alter abdominal subcutaneous adipose tissue gene expression of markers related to adipose tissue function, protein expression of mitochondrial OXPHOS complexes and adipocyte morphology in obese subjects, irrespective of their metabolic status.

OS3 – Clinical Management I

OS3.01

Improvements in risk factors contribute to the reduction in mortality risk after RYGB in type 2 diabetes: A nationwide, matched, observational cohort study

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Background: We recently showed that Roux-en-Y gastric bypass [RYGB] reduces risks of mortality, cardiovascular death and myocardial infarction in obese persons with type 2 diabetes (T2D) compared with matched individuals in clinical care during up to 8 years of follow-up. In this study we examined changes in risk factors and use of medications after RYGB, with the aim to explain these effects.

Methods: We matched (1:1) 6132 RYGB patients with T2D reported to the Scandinavian Obesity Surgery Registry to T2D patients who had not undergone RYGB, based on sex, age, BMI and calendar time, and assessed the effects from 2007 to 2014. Observations on BMI, HbA1c, LDL and HDL cholesterol, blood pressure (BP) and serum creatinine were evaluated as functions of time from index using a linear mixed repeated measure model, while observations on smoking status, use of blood pressure and lipid lowering medications were evaluated using a generalized mixed repeated measures model. Both models utilized a covariance matrix with compound symmetry. To allow convenient estimation of yearly means we attributed measurements done between 6 and 18 months to 1 year, between 18 and 36 months to 2 year, and so on.

Results: Baseline BMI was around 41 kg/m² in both groups. The maximal improvement in BMI was seen after 2 years (mean 32.5 kg/m²; 95%CI 32.3, 32.6), and after 1 year in HbA1c (mean 47.0 mmol/mol; 95%CI 46.5, 47.5) and BP in spite of less glucose-, BP- and lipid-lowering treatments in the RYGB patients. The maximal improvement in HDL cholesterol occurred after 3–4 years (mean 1.46 mmol/l, 95%CI 1.44, 1.48). The differences in BMI and HDL between the groups were statistically significant for up to 6 years of follow-up and in HbA1c during the full follow-up period, and lasted 2–3 years for LDL and BP.

Conclusions: Improvements in cardiovascular risk factors are likely to contribute to the reduction in mortality risk after RYGB in obese persons with type 2 diabetes.

OS3.02

Appetitive characteristics as predictors of quality of life after surgical and conventional treatment of severe obesity: Results from the Swedish Obese Subjects study

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Background/Objectives: Improvement in quality of life is an important outcome after bariatric surgery, but there is a limited understanding on the factors that predict long-term post-operative changes in quality of life. We examined whether appetitive characteristics (susceptibility to hunger and disinhibition) and cognitive restraint of eating predicted 10- and 15-year changes in depression, anxiety and obesity-related problems after surgical and conventional treatment for severe obesity.

Material/Methods: Participants were from an ongoing, matched (non-randomized) prospective intervention trial of the Swedish Obese Subjects (SOS) study. The current analyses included 2010 obese subjects

who underwent bariatric surgery and 1916 contemporaneously matched obese controls who received conventional treatment. Physical measurements (e.g., weight, height) and questionnaires (e.g., Three-Factor Eating Questionnaire, Hospital Anxiety and Depression Scale, Obesity-Related Problems Scale) were completed before the intervention and 0.5, 1, 2, 3, 4, 6, 8, 10, and 15 years after the start of the treatment. All analyses were adjusted for baseline age, sex, baseline body mass index, baseline quality of life, and surgery type (banding, vertical banded gastroplasty, gastric bypass).

Results: In surgically treated patients, baseline cognitive restraint, disinhibition and hunger were unrelated to 10- and 15-year changes in depression, anxiety and obesity-related problems. However, higher levels of disinhibition (std. beta = 0.06–0.13, $P < 0.05$) and hunger (std. beta = 0.08–0.15, $P < 0.05$) at 1-year follow-up were significantly associated with lower 10- and 15-year improvements in these quality of life indicators. Conventionally treated patients with higher baseline and 1-year levels of cognitive restraint, disinhibition and hunger were more likely to experience lower reductions in depression, anxiety and obesity-related problems (std. beta = 0.07–0.14, $P < 0.05$) over the 10-year period.

Conclusion: A higher susceptibility to eat in response to various internal and external cues shortly after surgery predicted less improvements in quality of life over time. Our findings provide additional evidence for that the first year after surgery is an important period for monitoring patients' appetitive characteristics to recognize those who may need more intensive post-operative support.

OS3.03

Preoperative Beta Cell Function is Predictive of Diabetes Remission after Bariatric Surgery

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Background: Bariatric surgery can improve glucose metabolism in obese diabetic patients but the factors that can predict diabetes remission are still under discussion. C-peptide and C-peptide area under the curve (AUC) during an oral glucose tolerance test (OGTT) have been suggested as useful predictors. However, the predictive accuracy of these two measures has never been compared neither other beta cell function indexes have been investigated.

Objectives: The present study aims to identify predictors of diabetes remission following surgery and to investigate the impact of preoperative beta cell function on postoperative diabetes status.

Materials & Methods: We investigated a cohort of 363 obese diabetic patients who underwent bariatric surgery. Clinical, anthropometric and analytic measures were evaluated prior and 12 months after the surgical procedure. The impact of preoperative beta cell function indexes on diabetes remission was explored through different models using bivariate logistic regression.

Results: Postoperative diabetes remission was achieved in 39.9% of patients at 12 months. Younger patients (OR 0.93; $p < 0.001$) and those with lower HbA1c (OR 0.60; $p = 0.001$) at the baseline evaluation had higher odds of diabetes remission. Use of oral anti-diabetics (OR 0.54; $p = 0.09$) and insulin therapy (OR 0.84; $p = 0.81$) did not reach statistical significance when they were adjusted for age and HbA1c. Among the evaluated indexes of beta cell function, higher values of IGI (insulinogenix index) ($p = 0.02$), Stumvoll 1st and 2nd phase indexes ($p = 0.02$), fasting C-peptide ($p = 0.04$), C-peptide AUC ($p = 0.002$), C-peptide/glucose AUC ($p = 0.006$), ISR AUC ($p = 0.01$) and ISR/glucose AUC ($p = 0.03$) predicted diabetes remission even after adjustment for age and HbA1c. Among them, C-peptide AUC had the higher discriminative power (AUC 0.76; $p < 0.001$).

Conclusions: Patients' age and preoperative HbA1c can forecast diabetes remission following surgery. Unlike other studies, our group found that the use of oral anti-diabetics and insulin therapy were not independent predictors of postoperative diabetes status. Preoperative beta cell function is useful in predicting diabetes remission and it should be assessed in all obese diabetic patients before bariatric or metabolic surgery.

OS3.04

Early Life Factors Predicting Change in Childhood Body Mass Index

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Background/Aims: Childhood obesity interventions that have taken a "common sense" approach to improve surface behaviours (e.g. diet and activity) have had underwhelming effects on childhood obesity[1, 2]. Interventions need to target a broader range of early-life exposures.

Objectives: With the intention to improve the success of future public health initiatives, we examined the associations between multiple early-life factors and (1) becoming overweight and (2) resolving overweight in childhood.

Material/Methods: Design: Longitudinal (mean 9-year follow-up) data from 363 children (mean age at baseline 6-years) in three harmonised community samples that were (1) not selected for BMI, (2) selected for overweight, and (3) selected for obesity. Baseline exposures: Child birth-weight, baseline BMI, waist circumference, diet, physical activity, global health, physical and psychosocial health; mother's concern for child's weight, BMI, education, age and neighbourhood disadvantage. Outcome: BMI change category (four categories below). Analyses: Logistic regressions, adjusted for potential confounders.

Results: Longitudinally, 137 children were never overweight, 57 resolved overweight, 28 became overweight, and 141 were always overweight. Multivariable analyses demonstrated that early-life child (OR 2.33) and maternal BMI (OR 1.18) increased the likelihood of normal weight children becoming overweight; while higher maternal education protected them from becoming overweight (OR 0.09). In addition, maternal (but not child) BMI (OR 0.68) and poor early-life child health (OR 0.17) were associated with lower likelihoods of overweight children resolving to normal weight. Higher maternal age was the only factor associated with a greater likelihood of overweight resolution (OR 1.21).

Conclusions: The results emphasise the arduous task of identifying early-life predictors of childhood BMI change and that "common sense" models tackling lifestyle change will not be successful. Our results suggest the attention should turn to more holistic intervention and focus on maternal characteristics.

Acknowledgement: We would like to thank the families for their continued participation in these studies.

Reference:

1 Wake, M., et al., *BMC Pediatrics*, 2012. 12(1): p. 39. 2.Wake, M., et al., *BMJ*, 2009. 339.

OS3.05

Kids4Fit: Evaluation of the effectiveness of a multidisciplinary intervention program for overweight and obese children in deprived areas

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Background: Children living in deprived areas are more often overweight or obese than children living in non-deprived areas. It is found to be challenging to implement weight management interventions in low socioeco-

nomic and ethnic minority communities, and keep participants engaged with the program. In the Netherlands, overweight and obese children from deprived areas in Rotterdam can be referred to Kids4Fit, a multidisciplinary intervention program. Since the effectiveness of Kids4Fit is unknown, the aim of this study was to evaluate the effectiveness of the Kids4Fit-intervention on the child's weight status and health related quality of life (HRQoL) on the long-term.

Methods: A prospective cohort study was conducted among 154 children in the age of 6–12 years old. All children were subscribed to Kids4Fit, a 12-week multidisciplinary intervention for overweight and obese children in deprived areas in Rotterdam, the Netherlands. The Kids4Fit-intervention was led by a dietitian, physiotherapist and child psychologist. Measurements of BMI-z, waist circumference and HRQoL (Pediatric Quality of Life Inventory, scale 0–100) were taken at the start of the waiting list-period (mean(SD) 23.3(10.9) weeks), at start of the intervention, at the end of the intervention and after 52 weeks. The effect of the intervention on BMI-z, waist circumference and HRQoL was analyzed using mixed model analyses adjusting for confounders and the change of the outcome measure during the waiting list period. All beta's are expressed in effect per week during the entire study period.

Results: The study population consisted of 66(42.9%) boys, mean age at baseline was 8.5(1.9) years and 21(14.7%) children had parents who were both born in the Netherlands. A significant effect of the intervention was found on waist circumference (β -0.0558, 95%CI -0.0950; -0.0166). Additionally, a positive trend for the effect of the intervention on BMI-z was found (β -0.0024, 95%CI -0.0053; 0.0004). No effect was found on HRQoL.

Conclusion: Kids4Fit positively affects physical outcome measures, with a clinically relevant change, but does not appear to influence HRQoL. 1. Conflict of Interest: None Disclosed 2. Funding: This study is funded by Fonds Achterstandwijken Rotterdam, the Netherlands.

OS3.06

Modifying mainstream weight management interventions for use with people with intellectual disabilities: A user centred approach

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Background, Aims and Objectives: Weight management interventions can contribute to health disparities if they are more effective for some groups within the population than others.¹ Vulnerable sub-groups such as people with intellectual disabilities (PWID) have a higher prevalence of overweight and obesity than the general population² but are less likely to be able to respond to uniformly delivered interventions.³ This study aimed to identify where modifications to a mainstream weight management intervention could provide a more acceptable and effective service for PWID.

Methods: A steering group of PWID contributed to this qualitative study, alongside researchers from the University of Sheffield and a national, commercial weight management organisation (Slimming World) which delivers a multi component intervention via weekly groups and online. Eight focus groups (n = 51) and 22 qualitative interviews were conducted with PWID, people delivering, and PWID currently receiving the intervention, and carers. Data were analysed to identify features of the intervention thought to facilitate or inhibit access, acceptability and utility for PWID. Preliminary findings were used to generate a set of principles for refining weight management interventions for PWID.

Results: Four overarching principles were identified: i.) Simplify the content of the information given, ii.) Provide information in a format suited to the literacy skills of the individual iii.) Provide guidance and support to personnel to work with PWID and iv.) Engage carers throughout. Three

of these linked to existing components of the intervention and one was additional. Empirically grounded modifications were recommended according to these principles.

Conclusions: This study identified four principles for adapting mainstream, weight management interventions for overweight and obese PWID to improve acceptability and utility and ensure a more equitable service for overweight and obese PWID.

References:

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- 2 Melville et al. The prevalence and determinants of obesity in adults with intellectual disabilities. *J Appl Res Intellect Disabil* 2008.
- 3 Allerton & Emerson. British adults with chronic health conditions or impairments face significant barriers to accessing health services. *Public Health* 2012

OS3.07

High prevalence of psychiatric disorders and 6-months weight outcomes of a structured obesity treatment program

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Background: Depression and anxiety are frequently associated with obesity, and also related to greater difficulties to loose weight. Neuropsychiatric disorders are also common among severely obese patients. **OBJECTIVE:** We analysed prevalence of depression, anxiety and neuropsychiatric disorders among severely obese adults admitted to an obesity unit, together with analysis of and 3- and 6-months weight changes in obese patients with or without psychiatric disorder.

Material/Methods: We included 113 obese men and women (mean age 45.3±13.8 years and BMI 40.1±5.2 kg/m²) admitted for non-surgical weight loss treatment to the Obesity Unit at Sahlgrenska University Hospital. Prevalence of diagnosed depression, anxiety, bipolar and neuropsychiatric disorders were determined, and weight changes during 3 and 6 months were calculated.

Results: 30.1% of the total group had a psychiatric disorder when admitted; 34.1% of the women and 19.4% of the men. Depression and anxiety were the two most common disorders among women. Patients with and without psychiatric disorders had similar pre-treatment BMI (39.2±4.4 vs. 40.5±5.5 kg/m², *P* = 0.085). After 3 months, patients with and without psychiatric disorders lost -5.8±9.2 and -11.4±8.0 kg in weight, respectively (*P* = 0.0051). After 6 months, weight losses were -7.2±10.1 and -13.8±8.7 kg (*P* = 0.0036) in obese patients with and without psychiatric disorders, respectively.

Conclusion: A large proportion of severely obese patients admitted for weight loss treatment to a specialist obesity unit suffer from psychiatric disorders. Although similar BMI at start of treatment, patients with psychiatric disorder loose, in the short term, significantly less weight compared with obese patient without a diagnosis of psychiatric disorders. It is important to screen for psychiatric disorders among obese patients as these disorders have found to be highly prevalent and are potential barriers to successful weight loss.

OS3.08

Stigma and Knowledge as Determinants of Recommendation and Referral Behavior of General Practitioners and Internists

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Background: Despite reported effectiveness, weight loss surgery (WLS) still remains one of the least preferred options for outpatient providers, especially in Germany. The aim of this study was to examine the effect of stigma and knowledge on recommendation of WLS and referral to a surgeon by general practitioners (GPs) and internists.

Method: The sample consists of 201 GPs and internists from Germany. The questionnaire included questions on the perceived effectiveness of WLS, the frequency of recommendations of WLS, and referral behavior. Stigma, as well as knowledge was also assessed in this context. Linear and logistic regression models were conducted. A mediation analysis was carried out within post-hoc analysis.

Results: Knowledge (*b* = 0.258, *p* < 0.001) and stigma towards surgery (*b* = -0.129, *p* = 0.013) were related to the frequency of recommendation of WLS. Additionally, respondents, who were more likely to express negative attitudes towards WLS, were less likely to recommend WLS and thus refer patients to WLS (*b* = -0.107, *p* < 0.05). Furthermore, respondents with more expertise on WLS were more likely to recommend and thus refer patients to WLS (*b* = 0.026, *p* < 0.05).

Conclusion: This study showed that stigma plays a role when it comes to defining treatment pathways for patients with obesity. The question remains how this might influence the patients and their decision regarding their treatment selection. Interventions are required to make treatment decisions by physicians or patients independent of social pressure due to stigma.

Thursday, 2 June, 2016

OS7 – Growth/Early Life

OS7.01

Early-life body mass index (BMI) trajectories associated with resolution of youth obesity

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Background: Obese youth who become non-obese adults have the same risk of diabetes and heart disease as someone who has never had obesity. However, the early-life BMI trajectories of those who resolve youth obesity by adulthood have not been described. **AIM:** To determine the BMI trajectories from youth to adulthood for those who resolve youth obesity. **Material/Methods:** From 1980 to 2011 up to 8 measures of weight and height were collected from participants in the Cardiovascular Risk in Young Finns Study. Youth (those aged 3–18 years) obesity was defined using Cole's BMI cutpoints and adult (21–49 years) obesity was defined as BMI ≥30kg/m². Multilevel mixed models compared BMI trajectories of those who resolved youth obesity with those persistently obese from youth to adulthood.

Results: Of 229 individuals with youth obesity, 94 (41%) were not obese as adults. Those who resolved youth obesity had similar BMI at age 3, 6, and 9 years as those with persistent obesity but had significantly lower BMI (-1.8kg/m², *p* < 0.001) by age 12 years. The persistent obese continued a linear trend of increasing BMI compared with a plateauing in the resolution group (Figure). The maximum BMI difference occurred at age 49 years (-14.5kg/m², *p* < 0.001).

Conclusions: Efforts to amend BMI trajectories that lead to adult obesity should begin early in life. The natural resolution of youth obesity begins to occur around age 12 years, suggesting a sensitive window for secondary prevention before the adolescent years.

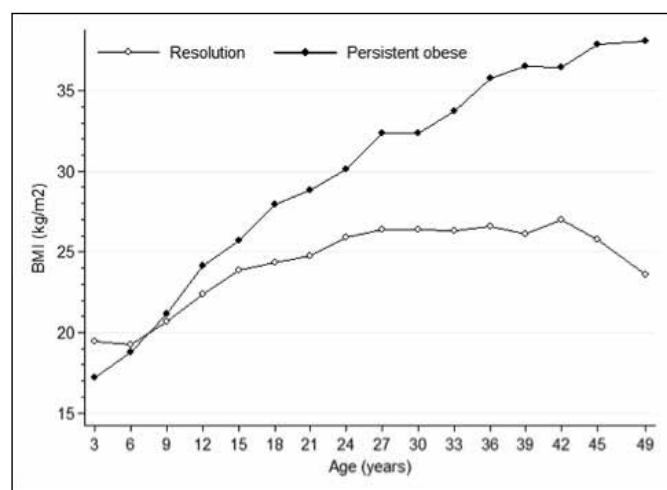


Fig. 1. This Figure shows those who were able to resolve their youth obesity by adulthood had similar BMI at age 3, 6, and 9 years but had significantly lower BMI by age 12 years compared with those who had persistent obesity in youth and adulthood. The persistent obese continued a linear trend of increasing BMI compared with a plateauing in the resolution group. These data suggest an important age-critical window that may determine future BMI status – where successful intervention may have most impact.

OS7.02

Maternal obesity, overweight and gestational diabetes affect the offspring neurodevelopment at 6-year of age – a follow up from the PREOBE cohort

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Background: Brain development during the pregnancy and until 6-years of life is critical to determine the performance of the intelligence areas. Overweight, obesity, and gestational diabetes in pregnant women are prevalent and increasing risk factors that may adversely affect the offspring long-term brain development. **AIM:** Investigate the long term influence of maternal metabolic pathologies on the neurodevelopment of their offspring at 6-years of life.

Methods: Children from PREOBE project (www.ClinicalTrials.gov NCT01634464) were studied (n = 101). Mothers were included during pregnancy into 4 groups according to their pregestational body mass index and their gestational diabetes status; overweight (n = 22), obese (n = 10), gestational diabetic (n = 17), and healthy normal weight controls (n = 52). Intelligence quotient (matrixes and vocabulary) were assessed by Brief Intelligence Test Kaufman (K-Bit). MANCOVA test and multiple linear regression models were used for data analysis with SPSS 22.0. Intelligence quotients were the dependent variable to show the differences in the mean by groups. All the models were adjusted for weight gain during pregnancy and a p-value < 0.05 was considered statistically significant

Results: At 6-years old, we found significant group differences in matrixes scores (p = 0.040). Post hoc test revealed lower scores in 6-years old children from the obese group compared to the normal weight group. The multiple linear regression analysis showed that the children born from obese mothers had 11 points less than the children born of normal weight

mothers, and each 3 kg of weight gain during pregnancy decreased the score of matrixes test in 1.2 points less; (95% CI: -0.357(-0.711, -0.003)). Moreover the weight gain during pregnancy, presented a negative association with the intelligence quotient.

Conclusions: Children from obese mothers show lower scores in the matrixes test at 6-years old and the pregnancy weight gain was associated with an important effect in the neurodevelopmental outcomes. This novel observation prompts further confirmative studies to explore potential placental and neurodevelopmental mechanisms involved. To focus in healthy eating habits including the weight gain during pregnancy should be an important target to achieve better global cognitive development in children.

OS7.03

Childhood height and body mass index at 7 years of age and incidence of adult type 2 diabetes

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Background: Childhood body mass index (BMI) is associated with adult type 2 diabetes (T2D), but few studies have investigated the effects of childhood height, which conceivably may alter the risk of T2D through different pathways.

Objectives: We investigated sex-specific associations between childhood height and risk of T2D throughout adulthood, taking the influence of BMI during childhood into account.

Material- Methods: We included 148,037 men and 144,790 women born 1930–1983 with weight and height measured at ages 7–13 years in the Copenhagen School Health Record Register. T2D information was obtained from the National Patient Register. Hazard ratios (HR; 95% confidence intervals [CI]) of T2D (≥30 years of age) were estimated for age- and sex-specific childhood height z-scores at age 7 years with adjustment for childhood BMI.

Results: From 1977–2013, 11,548 men and 7,472 women were diagnosed with T2D. Among men, the effect of height differed by BMI levels (p = 0.01). Among men with a below-average height (z-score < 0) and a below-average BMI (z-score < 0) at 7 years, being short was associated with an increased risk of T2D (HR = 0.88 per height z-score [0.84–0.93]) whereas a below-average height at 7 years had less effect on T2D if the BMI was above-average (z-score > 0) (HR = 0.95 per height z-score [0.90–1.00]). Among men with an above-average height (z-score > 0) at 7 years and below-average BMI, height did not show an association with T2D (HR = 1.03 per height z-score [0.97–1.09]), whereas men who also had an above-average BMI had a slightly decreased risk of T2D (HR = 0.95 per height z-score [0.90–1.00]). Among women, the effect of height did not differ by BMI levels. In models adjusting for BMI, inverse associations between below-average height (HR = 0.94 [0.90–0.99] per height z-score) and above-average height (HR = 0.93 [0.89–0.98] per height z-score) and T2D risk were found.

Conclusion: Independently of BMI, short childhood height increased the risk of T2D incidence suggesting that compromised linear growth during childhood may contribute to the aetiology of T2D. **FUNDING:** EU FP7 programme ERC Starting Grant Project ChildGrowth2Cancer no. 281419. EU H2020 research and innovation programme, No. 633595, DynaHEALTH. **CONFLICTS OF INTEREST:** None

Childhood body mass index and the risk of colon and rectal cancer in adulthood

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Background: Adult obesity is a well-established risk factor for colorectal cancer, however, few studies have examined the possible association with childhood obesity. It is therefore not clear if the association is due to development of obesity in adult life or may be influenced by body size already from childhood.

Objectives: To examine if childhood body mass index (BMI: kg/m²) (age 7 to 13 years) is associated with the risk of colon and rectal cancer in adulthood.

Material/Methods: We used the Copenhagen School Health Records Register to identify children who were born from 1930–1972 and had information on height and weight from their school health examinations. BMI was transformed into z-scores. Cases were identified by linkage to the Danish Cancer Registry using ICD-10 codes (colon: C18.0–18.9, rectal: C19.9 and 20.9). Analyses were conducted using Cox proportional hazard regressions stratified by sex and birth cohort.

Results: Among 257,623 individuals (49.7% women), 2,676 were diagnosed with colon cancer (47.5% women) and 1,681 with rectal cancer (38.9% women). Per z-score unit increase in BMI at age 13 years, the hazard ratio (HR) for colon cancer in adulthood was 1.09 (95% confidence interval [CI]: 1.04 to 1.14) in sex-stratified analyses. Results were essentially similar at all other ages (7 to 12 years). The results were mainly driven by the association observed between BMI and cancers of the sigmoid colon (C18.7, 1100 cases) with a HR of 1.11 (95% CI: 1.04 to 1.19) per unit of BMI z-score at age 13 years. Associations between BMI and rectal cancer were generally not significant. Only at age 11 years was a borderline significant association observed, with a HR of 0.95 (95%CI: 0.89 to 1.00) per unit of BMI z-score.

Conclusion: BMI in childhood was associated with the later risk of colon cancer, whereas there were limited indications of associations with rectal cancer. These findings suggest that BMI in childhood may influence the risk of colon but not rectal cancer in adulthood. The authors have no conflicts of interest to declare

Blood fatty acid composition in relation to obesity in children aged 2–11: Results from the European IDEFICS study

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Aim: The total intake of dietary fat has always been in focus discussing excess body weight but differences in dietary fat composition may also be important for adipose tissue development¹. Recent studies suggest that consumption of n-6 long-chain polyunsaturated fatty acids (LC-PUFA) is positively associated with body weight², but the role of n-3 LC-PUFA is controversial. A multicenter study of children in 8 European countries (IDEFICS) provided the opportunity to explore blood fatty acids (FA) as biomarkers for dietary intake and their association with obesity.

Methods: Among 2600 IDEFICS children selected to be part of a case-control study for overweight and obesity 23% were classified as overweight and 21% were classified as obese (Cole 2012). Circulating FAs were

measured in whole blood from fingertips, and recorded as percentage of weight of all FAs detected. Logistic regression of obesity status on quartiles of FA proportions was adjusted for age, sex, number of siblings, parental education, and country.

Results: N-6 LC-PUFA showed a dose-dependent association with prevalence of obesity, with odds ratios (OR) and 95% confidence intervals given by 1.3 (0.9, 1.8), 1.9 (1.3, 2.7), and 3.2 (2.2, 4.6) for the 2nd to 4th quartiles compared to the lowest quartile. N-3 LC-PUFA was also associated with more obesity, but with similar odds for the higher compared to the lowest quartile, OR = 1.6 (1.1, 2.2), 1.7 (1.2, 2.5), and 1.7 (1.2, 2.4). The ratio of n6:n3 LC-PUFA was not associated with obesity.

Conclusions: Our study showed that n-6 LC-PUFA was positively associated with obesity. This association is plausible due to increased production of inflammatory eicosanoids in obese subjects. The positive association of n-3 LC-PUFA with obesity is in contrast to previous evidence for lower body weight and a reduced risk of cardiovascular disease, and needs further investigation.

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The Swedish childhood obesity epidemic over seven decades: Starts 1971, peaks 1991, and stabilizes afterwards – The BEST cohort

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Childhood obesity increases the risk for adult obesity and for future disease. The aim with the present study, using the population-based BMI Epidemiology Study (BEST) Gothenburg, was to investigate longitudinal changes of childhood BMI, overweight, and obesity in Swedish boys since 1946 until present time. We collected detailed growth data (height and weight) from pediatric growth charts of Swedish boys born every fifth year between 1946 and 2006 (n = 1,588 for reference birth cohort 1946, n = 425 for each birth cohort 1951–2006). BMI at eight years of age was calculated for every individual. Mean childhood BMI at eight years of age has increased 0.88 kg/m² during the study period 1946–2006 (p for trend < 10⁻⁵⁷). The incline started from birth cohort 1971, peaked at birth cohort 1991 and stabilized afterwards. The BMI median reveals a distinct but moderate increase, although the higher percentiles demonstrate a more pronounced increase. As a result, there is an increased odds ratio for being overweight or obese for the different birth cohorts compared with the reference population 1946: for 1971 overweight 1.63 (1.09–2.43) and obesity 1.55 (0.64–3.76), and for 2006 overweight 4.2 (3.0–5.8) and obesity 9.9 (5.5–17.6). Adjustment for population changes during the study period did not alter the results. We provide evidence of a childhood obesity epidemic in Swedish boys born 1946–2006 that began in the 1970s, peaked in the 1990s, and stabilized afterwards. We used a unique population-based cohort covering an unrivalled long time span and number of included birth cohorts. We speculate that this trend will have severe consequences for future health and disease.

Should we worry about rapid weight gain in infancy?

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Background and Aims Evidence is contradictory as to what aspect of weight measurement in infancy should be of concern: for some rapid weight gain (RWG) is key, whereas other results emphasise absolute weight. This study uses three growth cohorts to investigate which measures are most useful in predicting overweight in childhood.

Objectives To investigate individual level associations between different weight markers in infancy and later outcomes at ages 4–5 and 7–9, using multiple European longitudinal growth datasets.

Material and Methods Three Northern European longitudinal growth datasets were used: Newcastle Growth and Development Study (UK: 1987); Gateshead Millennium Study (UK: 1999); Tampere Study (Finland: 2003). Weights, lengths and BMIs from birth to fifteen months were converted to age-sex-adjusted Z scores using the WHO standard. Associations between these measures and later overweight were explored and logistic regression models fitted. Super Imposition by Translation and Rotation growth curve Analysis (SITAR) was used to further explore growth during infancy in relation to later outcomes (Figure 1).

Results All infancy measurements were better at predicting weight outcomes at age 4–5 than those at ages 7–9. At age 4–5, the model containing SITAR measurements (size, velocity and tempo) explained the most variation in overweight (> 1 SD in Z score) and obesity (> 2 SD) (c.45% and c.30%, respectively), compared with standard measures, with tempo (timing of rapid growth) showing the strongest association ($\beta = 4.31$ and $\beta = 4.12$, respectively). In contrast, at age 7–9, weight and height Z scores best explained overweight ($\beta = 1.25$ and for weight and $\beta = -0.29$ for height), while RWG (an increase of > 2 SD between 3 and 12 months) and weight Z score best explained obesity ($\beta = -0.71$ and $\beta = 1.63$, respectively).

Conclusion Infancy measures were relatively weak predictors of overweight or obese in mid childhood. Clinicians should be aware that neither weight measurements alone, or rapid weight gain, can be used to reliably identify those at risk of later obesity.

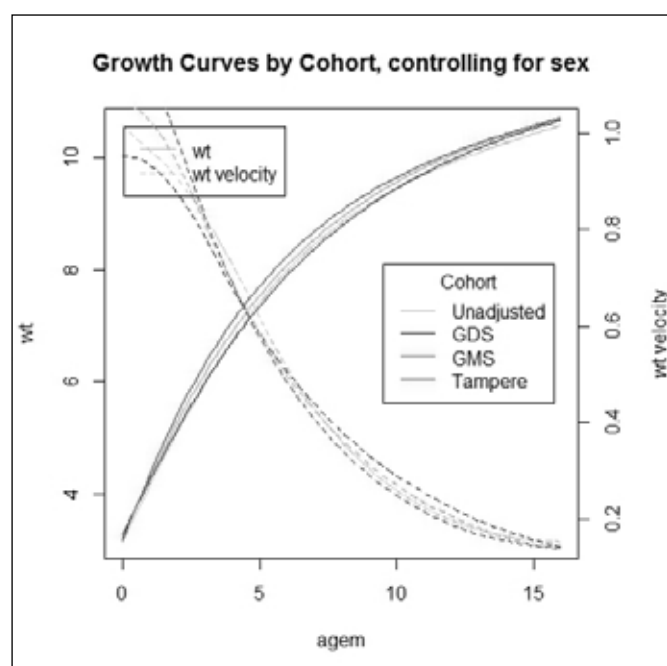


Fig. 1. This figure displays the growth curves and velocity curves produced by SITAR for each cohort, controlling for sex, as well as an unadjusted line.

Effects of family disposable income on development of height and BMI from birth up to eight years of age

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Introduction: Low socioeconomic position (SEP) is a known risk factor for development of obesity in childhood. The level of parental education is commonly used as proxy for SEP, but family disposable income is likely to also be of importance for SEP. The aim of this study was to determine the effects of family disposable income on BMI and height trajectories from birth up to eight years of age, and the development of obesity at eight years of age.

Methods: Growth data from birth to eight years age were collected for 3030 Swedish children. Register data on family disposable income was retrieved from Statistics Sweden, and dichotomized for the analysis by the median value for the group. Register-derived information on parental education and national background, maternal BMI, age and smoking status were considered as covariates in longitudinal mixed models and regression analyses.

Results: Mean birth weight was lower in families of lower income, 3.51 kg (SD 0.54) vs. 3.60 kg (SD 0.53) for children of higher-income parents, $p < 0.0001$. By age 5.5 years and 8 years, however, a reversed relation between groups was seen, where the children of lower income families showed significantly higher mean BMI. This difference was no longer significant when adjusting for covariates. Considering height, lower income was strongly related to lower height at 5.5 and 8 years, differences were strengthened after adjusting for confounders, -0.44 cm (95% CI -0.75 , -0.13) for age 5.5 years and -0.56 cm (95% CI -0.88 , -0.23) at 8 years. The OR of obesity at 8 years age was 1.69 (95% CI 1.05–2.7) for the group of low income compared to the group of high income.

Conclusions: Low family disposable income is related to increased risk of childhood obesity at 8 years of age. This could be attributed to a different growth pattern compared to children of high income. Our findings that children of lower family income had lower mean birth weight and displayed lower height later in childhood suggest that these children might have an unfavourable metabolic profile and increased risk of developing the metabolic syndrome.

Friday, 3 June, 2016

OS8 – Inter-organ crosstalk

OS8.01

Brain network plasticity is associated with weight loss induced by chronic vagal stimulation

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Introduction: Obesity alters the behavior of the meso-limbic reward network that ultimately impacts on the activity of the prefrontal cortex as a consequence of modified dopamine signaling (Volkow et al, 2011). Chronic vagal stimulation (VNS) has the capability to change food intake pattern and to facilitate plasticity via the enhancement of neuromodulatory transmission (Hays et al, 2013). The aim of this study was to evaluate

the impact of chronic vagal stimulation over time on brain activity and to correlate these plastic changes with the weight loss associated with the procedure.

Methods: Ten adults age-matched miniature minipigs were given 3 months of obesogenic diet. Once obese, they were fitted with cuff electrodes around the abdominal vagi using laparoscopy and VNS was applied immediately in half of them (VNS group) while the remaining were fitted with non-functional stimulators (Sham group). Brain metabolism maps were obtained 10 days (Early) and 90 days (Late) after surgery. These maps were derived from FDG dynamic PET imaging coupled with continuous arterial input function measurement during euglycemic hyperinsulinic clamp using pixel-wise modeling (PXMOD). Arterial catheterization was performed under ultrasound guidance. The arterial puncture was closed with angioseal. The activation maps were analyzed using statistical parameter mapping with a full Monty model (SPM8). Conjunction analysis was also performed.

Results: Body weight was reduced in VNS compared to sham group, 75 and 90 days after the onset of VNS (Table). Ten days after the onset of stimulation, activation were detectable in the substance nigra, the putamen, the cingulate and pyriform cortices. The same areas remained activated 90 days after the onset of stimulation but to a lesser extend (Figure). Several activation blots were detectable in the prefrontal cortex in the late condition only.

Conclusions: Irrespective of the duration of the stimulation, VNS activates the nigrostriatal network but this activation diminished with time since this network is known to be prone to plasticity. On the contrary, prefrontal activation was present in late scans only suggesting that it might be causative for the reduced body weight in stimulated obese group. Statistical analysis of the PET images immediately after or at distance of VNS onset

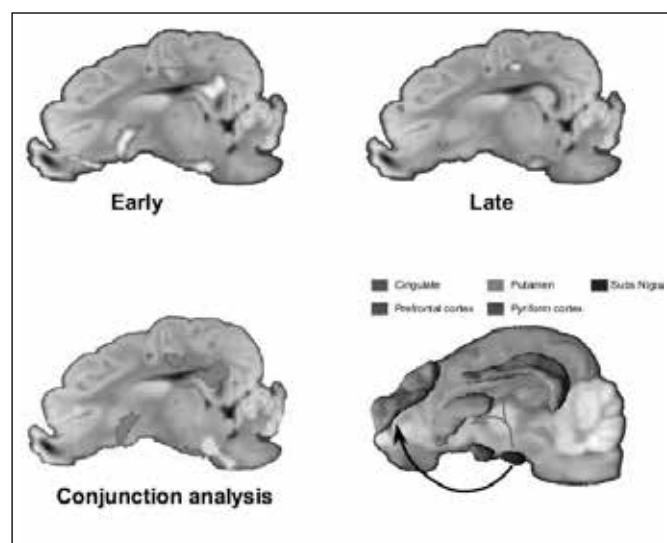


Fig. 1. Top row: Statistical Tmaps ($p = 0.005$ corr, cluster size threshold 50 mm³) demonstrating positive activation for VNS versus sham group. Left image showed activations obtained after 10 days of stimulation (Early) whereas right image presented activations after 90 days of continuous stimulation (Late). Bottom left figure represented conjunction analysis for Early and Late conditions. Red areas were associated with the early condition whereas green ones were linked to late condition. Areas with overlapping colors were simultaneously activated in both conditions. Bottom right figure represented the brain network involved. Black arrow – transthalamic substance nigra – prefrontal network

OS8.02

Retinoblastoma protein knockdown favors oxidative metabolism and glucose and fatty acid disposal in muscle cells

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Background & Aims: Cell cycle regulatory proteins modulate metabolism in addition to cell proliferation and survival. An important protein in this context is the retinoblastoma (Rb) Protein. Rb deficiency favors leanness and a healthy metabolic profile in mice largely attributed to activation of oxidative metabolism in white and brown adipose tissues [1]. Less is known about Rb modulation of skeletal muscle metabolism. **OBJECTIVE:** To delineate the interaction of Rb silencing with the metabolic fate of skeletal muscle cells, focusing on its impact on substrate oxidation, lipid metabolism, glucose disposal and insulin sensitivity.

Material/Methods: Transient knockdown of Rb expression in differentiated C2C12 myotubes using small interfering RNAs was applied.

Results: Compared with control cells transfected with non-targeting RNAs, Rb-silenced myotubes had increased expression of genes related to fatty acid uptake and oxidation such as Cd36 and Cpt1b (by 61% and 42%, respectively), increased Mitofusin 2 protein content (~2.5-fold increase), increased mitochondrial to nuclear DNA ratio (by 48%), increased oxygen consumption (by 65%) and decreased intracellular lipid accumulation. Rb-silenced myotubes also displayed up-regulated levels of glucose transporter type 4 expression (~5-fold increase), increased basal glucose uptake, and enhanced insulin-induced Akt phosphorylation. Additionally, exercise in mice led to increased Rb phosphorylation (inactivation) in skeletal muscle as evidenced by immunohistochemistry analysis.

Conclusion: Rb silencing enhances mitochondrial oxidative metabolism and fatty acid and glucose disposal in skeletal myotubes and changes in Rb status may contribute to muscle physiological adaptation to exercise [2].

Acknowledgement: Supported by EU-FP7 (DIABAT, num. 278373).

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OS8.03

Short-chain fatty acids affect intracellular lipolysis in a human adipocyte model

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Background/Aims: Gut-derived short-chain fatty acids (SCFA), formed by microbial fermentation of dietary fibres, are believed to be involved in the aetiology of obesity and diabetes. Previous data from our group showed that colonic infusions of physiologically relevant SCFA mixtures attenuated whole-body lipolysis in overweight men. To further study potential mechanisms involved in the antilipolytic properties of SCFA, we aimed to investigate, in vitro, the effects of SCFA incubations on intracellular lipolysis and signalling using a human white adipocyte model, the hMADS cells.

Methods: hMADS adipocytes were incubated with mixtures of acetate, propionate and butyrate or single SCFA (acetate, propionate and butyrate) in concentrations ranging between 1 μmol/L and 1 mmol/L. Glycerol release and lipase activation was investigated during basal conditions and β-adrenergic stimulation.

Results: SCFA mixtures high in acetate and propionate decreased basal glycerol release, when compared to control ($P < 0.05$). Incubation with

only acetate decreased basal ($1\mu\text{mol/L}$) and β -adrenergically ($1\mu\text{mol/L}$ and 1mmol/L) mediated glycerol release, when compared to control and butyrate incubation ($P < 0.05$). In contrast, butyrate ($1\mu\text{mol/L}$) incubation slightly increased basal and β -adrenergically mediated glycerol, when compared to control ($P < 0.05$). The antilipolytic effect of acetate was accompanied by a reduced phosphorylation of hormone sensitive lipase (HSL) at serine residue 660. In addition, G-protein coupled receptor (GPCR) knockdown following pertussis toxin treatment prevented the antilipolytic effect of acetate.

Conclusion: Our data indicated that mainly acetate has antilipolytic effects in hMADS adipocyte and acts via attenuation of HSL phosphorylation in a GPCR-dependent manner. Therefore, the modulation of colonic and circulating acetate may be an important target to modulate human adipose tissue metabolism. Competing Interest: "The authors have declared that no competing interests exist." Financial disclosure: "The research is funded by TI Food and Nutrition, a public-private partnership on pre-competitive research in food and nutrition. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript."

OS8.04

Autonomic nervous imbalance induced by obesity is directly related to altered brain glucose metabolism

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Introduction: Morbidly obese patients display a peripheral autonomic nervous imbalance (Windham et al, 2012) and an impaired glucose metabolism (Iozzo, 2015). The aim of this study is to evaluate the relationship between these parameters on an animal model of acquired obesity.

Methods: 15 adults age-matched miniature pigs were tested for autonomic balance and glucose metabolism before (32 ± 2.5 kg) and after 3 months of an obesogenic diet (48 ± 3.6 kg). Autonomic balance was obtained through the measurement of heart rate variability. ECG was recorded for 24 hours using a portable digital recorder (Actiwave, UK). After QRS detection, heart rate variability HRV was extracted using frequency domain analysis and LF/HF (low to high frequencies) ratio was calculated (Bio-medical toolkit, National Instruments, USA). Brain, hepatic and skeletal muscle metabolism were quantified as insulin-mediated glucose uptake using FDG dynamic PET (Siemens) imaging coupled with continuous arterial input function measurement during euglycemic hyperinsulinemic clamp. Brain, liver and skeletal muscle glucose uptake were obtained by kinetic modeling of PET and arterial data (Pmod, Switzerland). Correlations between parameters were calculated using PRISM (Graphpad, USA).

Results: LF/HF ratio was significantly increased in obese condition (0.55 ± 0.074 vs 3.1 ± 0.301 for lean and obese conditions, $p = 0.004$). Insulin-mediated glucose uptake was significantly reduced at the brain, liver and skeletal muscle level (reduction by 36.8, 46.1 and 22.7% respectively between lean and obese conditions). Correlation between LF/HF and brain glucose uptake was negative as expected ($R^2 = 0.87$, $r = -0.811$, $p = 0.0014$). Similar degree of correlation were found for the frontal, temporal, parietal, insular and occipital cortices as well as the stratal and thalamic areas. On the contrary, the correlation between LF/HF and hepatic or skeletal muscle glucose uptake was poor to inexistent ($R^2 = 0.0024$ and 0.0033 with $p = 0.867$ and 0.23 for liver and muscle respectively).

Conclusions: Peripheral autonomic nervous imbalance induced by obesity is directly related to altered brain glucose metabolism irrespective of the brain region. This relationship did not exist for the liver and the skeletal muscle for which the decreased glucose uptake cannot be related to changes in HRV.

OS8.05

Activation of gastrointestinal bitter taste receptors suppresses food intake and stimulates secretion of gastrointestinal peptide hormones in healthy men

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Introduction: Gut chemosensory mechanisms, particularly those involved in detecting and relaying to the brain the chemical composition of food during digestion, play important roles in controlling gut function and appetite regulation. Activation of bitter taste receptors, expressed throughout the gastrointestinal tract by enteroendocrine cells, may modulate feeding behaviour via the release of gut peptide hormones, a mechanism we have termed the "bitter brake". Our aim was to establish the efficacy and site of action of a bitter, plant-based, non-nutritive ingredient (Amarasate™ extract) to modify acute energy intake, subjective ratings of appetite and gut peptide hormone concentrations.

Methods: Twenty healthy lean ($\text{BMI} = 23.5 \pm 0.3 \text{ kg/m}^2$) male volunteers participated in a randomised three treatment, double blind, cross-over study with a 1 week washout between treatments. Overnight fasted participants were cannulated and provided with a standardised 2MJ Breakfast (0900h). Treatments (500 mg Amarasate extract or Placebo) were administered in low pH resistant (1100h) or standard (1130h) hypromellose capsules for targeted duodenal or gastric release, respectively. To maintain treatment blinding, placebo capsules were also administered as part of each treatment. Energy intake was recorded at an ad lib lunch (1200h) and snack (1400h). Blood samples and visual analogue scale subjective ratings of appetite were taken throughout the day.

Results: Compared with placebo, both gastric and duodenal delivery of the Amarasate extract stimulated significant increases ($p < 0.05$) in the gut peptide hormones CCK, GLP-1 and PYY while significantly reducing ($p < 0.05$) total (lunch plus snack) ad lib meal energy intake by $911 (\pm 308) \text{ kJ}$ and $944 (\pm 309) \text{ kJ}$, respectively. However, no significant treatment effects were observed for any subjective ratings of appetite or nausea.

Conclusion: We have demonstrated that activation of the "bitter brake" mechanism by a bitter plant extract can stimulate the release of gut peptide hormones involved in appetite regulation and suppress subsequent feeding behaviour in healthy men. Acknowledgement: This study was funded by the NZ Ministry of Business, Innovation & Employment (C11X1004).

OS8.06

Does body composition influence food hedonics (food liking and wanting) in overweight and obese individuals?

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Background: Recent evidence indicates that fat-free mass and fat mass may have independent roles in the regulation of the homeostatic component of appetite. However, little is known about the influence of body composition on food hedonics (i.e. food liking and wanting). **OBJECTIVE:** The present study examined the relationships between body composition and liking and wanting for food.

Methods: 65 overweight and obese individuals ($\text{BMI} = 30.9 \pm 3.8 \text{ kg/m}^2$) completed two test meal days in which hedonic measures of explicit liking (subjective ratings) and implicit wanting (speed of forced-choice) for an array of high fat and low fat foods were tested in the fasted state, while body composition (air-displacement plethysmography) was also measured.

Results: Fat-free mass ($\beta = 0.436$; $p < 0.001$), but not fat mass ($\beta = 0.183$; $p = 0.107$), predicted explicit liking for high fat versus low fat food ($r = 0.480$, $R^2 = 0.231$, $p < 0.001$). However, both fat-free mass ($\beta = 0.356$; $p = 0.002$) and fat mass ($\beta = 0.285$; $p = 0.014$) were found to be independent predictors of implicit wanting ($r = 0.466$, $R^2 = 0.217$, $p = 0.001$).

Conclusion: These data suggest that fat mass and fat-free mass have independent effects on explicit liking and implicit wanting for high fat versus low fat food. The outcome adds to a growing body of evidence on the association between body composition and appetite control.

OS8.07

Selected Non-Communicable Disease (NCD) burden attributable to dietary risks and low physical activity for the Republic of Ireland in 1990 and 2013

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Background: Lower physical activity levels and improper nutrition is associated with an increased risk of several NCDs. Changes in dietary and lifestyle patterns are becoming increasingly significant causes of disability and premature death. WHO declared processed meat to be carcinogenic.

Objectives: Quantify the number of deaths, Years of Life Lived with Disability (YLDs), Disability Adjusted Life Years (DALYs) from selected NCDs (IHD, stroke, COPD, diabetes and cancer) that are attributable to the following risk factors- low physical activity, dietary risks- a diet high in processed meat, a diet high in sodium, a diet high in trans-fatty acids, a diet low in fruits and a diet low in vegetables.

Methods: Openly accessible data for the above mentioned NCDs and risk factors was extracted from the Institute of Health metrics and Evaluation (United States) website¹ for Ireland. The burden metrics computed were- YLDs: product of disability weight and prevalence; Years of Life Lost to premature mortality (YLLs): product of total deaths at each age and the reference life expectancy at that age; and DALYs = YLDs + YLLs. The estimates are based on total disease conditions and risk factors and are analysed on the GBD study. The absolute number of deaths, DALYs (per 100,000) and YLDs (per 100,000) from the NCDs attributable to the risk factors for 1990 and 2013 are calculated.

Results: Low Physical activity contributed to the largest number of deaths, DALYs and YLDs from the selected NCDs in both calendar years. Deaths from the NCDs attributable to selected risk factors declined from 1990 to 2013 for all the risk factors except for a diet high in processed meat. The deaths from this risk factor increased from 1138 in 1990 to 1238 in 2013. Total DALYs (per 100,000) from the NCDs attributable to all the risk factors combined almost halved from 4722 in 1990 to 2219 in 2013. YLDs (per 100,000) from the NCDs attributable to low physical activity and a diet high in processed meat showed increases over the years.

Conclusion: NCD deaths in Ireland attributable to the risk factors have improved considerably. The other burden metrics attributable to other risk factors have also improved considerably except for a diet high in processed meat which continues to be a serious problem that requires effective intervention.

Acknowledgement: My co-authors

Total burden of the selected NCDs attributable to the risk factors- dietary risks and low physical activity for 1990 and 2013.

Reference:

www.healthdata.org

Risk factor	Absolute number of deaths from NCDs attributable to the particular risk factor		Number of DALYs (per 100,000) from NCDs attributable to the particular risk factor.		Number of YLDs (per 100,000) from NCDs attributable to particular risk factor.	
	1990	2013	1990	2013	1990	2013
Low physical activity	2330	1745	1196	674	95	138
Dietary risks						
Diet high in processed meat	1138	1238	685	615	62	158
Diet high in sodium	1358	865	653	283	22	21
Diet high in trans-fatty acids	499	188	277	73	6	4
Diet low in fruits	2084	1370	1073	502	37	35
Diet low in vegetables	1655	1018	838	355	35	35
Totals	9064	6424	4722	2219	257	391
**All values are rounded off to the nearest integer value.						

Fig. 1. This table shows the total number of deaths, DALYs (per 100,000), YLDs (per 100,000) from the selected NCDs attributable to the selected risk factors- low physical activity and dietary risks for the Republic of Ireland in 1990 and 2013.

OS8.08

Dynamism of the Hypothalamic Transcriptome Uncovers “Stages” during the Development of Diet-induced Obesity in Mice

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Background: Hypothalamus plays a central role in energy homeostasis. Although a role of high-fat diet (HFD)-provoked hypothalamic injury has been implicated in the pathogenesis of leptin resistance and obesity, precise molecular mechanisms remain unveiled. Here we examined the transcriptomic changes in the three major energy centers within the hypothalamus: arcuate (ARC), paraventricular (PVN), and lateral (LH) nuclei, and analyzed the changes during the course of the development of diet-induced obesity in mice.

Methods: ARC, PVN, and LH were micro-dissected from B6 mice fed either HFD or control low-fat diet (LFD) for 3 days, 2 weeks, 6 weeks and 16 weeks, and transcripts were analyzed by RNA sequencing ($n = 3$). We defined “Differentially Expressed Gene (DEG)” when the expression level of a transcript under HFD is > 1.5 or $< 1/1.5$ fold of control and the difference is statistically significant ($P < 0.05$). (1) Numbers of DEGs counted, (2) DEGs analyzed by cluster analysis, (3) Gene ontology (GO) analysis was undertaken for each cluster, and (4) Upstream regulator (UR) explored by IPA®.

Results: (1) Total numbers of DEGs at one or more time points were 1486 (ARC), 1585 (PVN), and 1398 (LH). The number of DEGs peaked at 6 weeks in ARC and LH, whereas at 3 days in PVN. (2) DEGs in every nucleus were clustered into 5 groups: one with commonly downregulated transcripts throughout four time points, and the other four groups each consisting of transcripts specifically upregulated at only one time point. (3) GO terms assigned to each cluster were unique to the nucleus/time point combination. (4) On the 3rd day of HFD, three nuclei shared URs

associated with cell cycle/proliferation. After 16 weeks of HFD, URs were commonly associated with inflammation.

Conclusion: We can now propose a concept of “Stages” of obesity, defined by a specific group of upregulated hypothalamic transcripts, with each group of genes corresponding to a specific set of subcellular locations or molecular functions. Furthermore, earlier and later stages of obesity were commonly characterized by cell cycle/proliferation and inflammation, respectively, throughout hypothalamic nuclei.

Saturday, 4 June, 2016

OS11 – Clinical Management II

OS11.02

Biopsy-proven liver fibrosis and its association with non-invasive fibrosis and metabolic markers in morbidly obese patients

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Background & Aims: Non-alcoholic steatohepatitis (NASH) is the progressive form of fatty liver disease (NAFLD) and can advance to fibrosis and cirrhosis [1] with increased morbidity and mortality risk [2].

Objectives: The purpose was to examine the prevalence of liver fibrosis and respective predictive markers in patients undergoing metabolic surgery with vitamin D deficiency ($< 75\text{nmol/L}$). Material & methods Baseline liver biopsy in the context of a randomized controlled trial [3] was performed in 46 patients with omega-loop-gastric-bypass. Uni- and multivariate analyses were used to test predictive relevance of clinical, laboratory and histological data.

Results: 80% females, aged 42 (13) years (BMI: 44 (4) kg/m^2), of whom 26% had diabetes mellitus (T2DM) and 44% a metabolic syndrome (MeS) were investigated. 72% presented with NASH, 11% with simple steatosis and 17% with normal liver histology. 30% demonstrated significant fibrosis [$F \geq 2$; 9% advanced (F3) and 4% cirrhosis (F4)]. Fibrosis was primarily predicted by higher levels of HOMA2-insulin resistance (IR; $\beta = 0.474$, $p < 0.05$), procollagen-type-I-propeptide (P1NP; $\beta = 0.401$, $p < 0.05$), lower osteocalcin ($\beta = -0.325$, $p < 0.05$), albumin corrected calcium ($\beta = -0.298$, $p < 0.05$), parathyroid hormone (PTH, $\beta = -0.290$, $p < 0.05$), 25-hydroxy-vitamin-D ($\beta = -0.255$, $p < 0.05$), male sex ($\beta = 0.286$, $p < 0.05$), and higher age ($\beta = 0.206$, $p < 0.05$). Other independent risk factors for advanced fibrosis were T2DM (OR = 12.8 [1.2–137.4], $p < 0.05$) and MeS (OR = 9.3 [0.99–87.5], $p = 0.052$).

Conclusion: Liver fibrosis with increased operative risk is frequent in morbidly obese patients with concurrent T2DM and/or MeS. Higher serum levels of HOMA2-IR, P1NP, osteocalcin and lower serum calcium, PTH and VDD are clinically relevant predictors of liver fibrosis. Hence, we suggest that patients with preoperative presence of these markers are at increased risk for liver fibrosis and should be monitored closely.

Acknowledgement: ML, BL, RK, CK, ST, and MT designed the research. ML analyzed the data, performed statistical analyses and drafted the abstract. All authors approved the final version.

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OS11.03

Metabolic outcomes after an 8 weeks low-calorie-diet in overweight, pre-diabetic individuals: The role of gender in the PREVIEW study

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Background & Aims: Lifestyle intervention remains the corner stone in prevention and management of type-2 diabetes (T2D). The PREVIEW intervention study (www.previewstudy.com) is to date the largest, multi-national study with the aim of preventing T2D among pre-diabetic individuals with a combination of diet, physical activity and behavior modification. Initially, all participants follow a formula low-calorie diet (LCD) to achieve a significant weight loss ($\geq 8\%$ of initial body weight, BW). Although the majority of participants in LCD weight loss studies are women, very little attention has been paid to the role of gender.

Objectives: To compare the effect of 8 weeks' LCD on weight loss and metabolic outcomes between pre-diabetic men and women. Material & methods The participants received LCD [810 kcal daily] for 8 weeks (Cambridge Weight Plan®). Data from participants who achieved 8% weight loss were included in the analysis. Two-sided t-tests were used throughout. Linear regressions were applied to test correlations.

Results: Of 2,326 individuals eligible for the LCD period, a total of 1,842 (79%) participants (1,225 women and 617 men) completed the weight loss phase successfully. At baseline, mean (\pm SD) age was 51.6 ± 11.6 years, BMI 35.3 ± 6.5 kg/m^2 , fasting plasma glucose 6.2 ± 0.7 mmol/L, and fasting serum insulin 13.4 ± 7.8 mU/L. Average weight loss was 10.6 ± 4.0 kg, with men losing 12.7 ± 4.2 kg and women 9.6 ± 3.4 kg (difference between gender, $P < 0.001$). The men lost $11.7 \pm 3.5\%$ of initial BW where the women lost $10.2 \pm 3.1\%$ ($P < 0.001$). Fasting plasma glucose decreased by 0.57 ± 0.7 mmol/L in men, and by 0.37 ± 0.6 mmol/L in women ($P < 0.001$). Fasting serum insulin decreased by 5.8 ± 7.4 mU/L in men and by 3.8 ± 5.4 mU/L in women ($P < 0.001$). The linear model showed an association of the weight loss percentage as well as gender on the changes in glucose and insulin.

Conclusion: An 8 weeks' LCD intervention resulted in a marked decrease in body weight, fasting glucose and insulin among pre-diabetic subjects. Significantly larger decreases were seen in men versus women. Funding EU FP7, grant agreement 312057; NHMRC – EU Collaborative Grant, AUS; NZ Health Research Council (14/191), UoA Faculty Research Development Fund; The Cambridge Weight Plan has kindly donated all LCD products.

Differential expression of tumorigenesis-related genes in blood leukocytes of obese women with and without breast cancer

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Background: Obesity is increasing worldwide and is associated with higher risk for breast cancer. It was proposed that factors produced by obese adipose tissue can regulate the tumorigenesis-related gene expression. Blood leukocytes (PBMcs) can be a suitable RNA source and model of tissue biopsies. **OBJETIVES:** This work evaluates the expression of the oncogenes BIRC5, ALDH3A1 and MYC, as well as the tumor suppressor genes SIRT6, TP53 and PTEN in PBMcs from both, tumor-free and breast cancer patients, depending on the obesity state.

Methods: Blood samples were obtained from tumor-free normalweight (n = 10; 28.2±3.5 y; BMI (kg/m²) 21.4±1.6) or obese women (n = 8; 40.0±13.7 y; BMI 38.8±2.8), as well as from breast cancer normalweight (n = 33; 49.5±9.4 y; BMI 23.4±1.9) or obese women (n = 48; 59.0±10.7 y; BMI 31.6±4.1). PBMcs were obtained from blood and RNA was extracted for qRT-PCR analysis.

Results: The analysis of PBMcs from tumor-free patients showed an increase in BIRC5 (3.69±1.21; p = 0.011), ALDH3A1 (4.01±0.84; p = 0.013) and MYC (3.01±1.44; p = 0.030), as well as the tumor suppressor genes SIRT6 (4.71±0.79; p = 0.005), TP53 (3.36±1.06; p = 0.014) and PTEN (7.97±3.7; p = 0.002) in obese individuals compared to lean controls. In breast cancer patients, the overexpression of the oncogenes BIRC5 (1.76±0.50; p = 0.019), ALDH3A1 (2.13±0.66; p = 0.036) and MYC (2.04±0.49; p = 0.017) was observed in obese individuals, while no statistical differences were detected for the tumor suppressors SIRT6 (0.57±0.12; p = 0.096), TP53 (0.56±0.12; p = 0.105) and PTEN (0.51±0.18; p = 0.171).

Conclusion: These results show that in tumor-free women, obesity induces an increase in tumor promoter genes, which is counterbalance by an enhanced tumour suppressor activity. However, in breast cancer patients, the increase in tumor promoter genes induced by obesity is not compensated by the tumour suppressor genes. Thus, if the obese state is prolonged over a period of time, cancer may be facilitated. Furthermore, these data point out to the potential application of PBMcs instead of tissue biopsies to study the effect of obesity on breast cancer development.

Insulin/IGF-1 signalling in colon mucosa following diet-induced weight loss and its implications for colorectal tumorigenesis: The INTERCEPT study

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Background: Obese individuals are at a significantly increased risk of colorectal cancer (CRC), but the biological mechanisms through which obesity promotes colorectal tumorigenesis are incompletely understood. It has been hypothesised that insulin and IGF-1 (often raised in the obese) may promote CRC development through their pro-mitotic and anti-apoptotic activity.

Objectives: In the context of the INTERCEPT study, we tested the effect of diet-induced weight loss (low-energy meal-replacement diet) on tran-

scription levels of selected genes in the insulin/IGF-1 signalling pathway in colon mucosa samples collected pre- and post-intervention.

Methods: Pre and post-intervention fresh-frozen colon mucosa punch biopsies preserved in RNAlater[®] were available for 7 participants for which anthropometric measurements, as well as fasting serum levels of glucose, insulin, and IGF-1, were also available. RNA was extracted and hybridised to HumanHT-12 v4 Expression BeadChip (N = 24, 8 participants × 2 time points + 4×2 technical replicates). Genes in the insulin/IGF-1 signalling pathway were selected using curated gene sets including BioCarta, Gene Ontology, and KEGG (N = 157, corresponding to 284 transcripts). Transcription levels were analysed using linear mixed effects models including interactions between time and each serum biomarker after adjustment for sex, age, and BMI.

Results: A total of four genes were significantly differentially expressed in colon tissue following weight loss and reduction in insulin and IGF-I levels; no associations were found with changes in fasting glucose levels. In particular, insulin levels were found to be associated with transcriptional activity of IGF2 and PKLR, and IGF-1 levels with those of INPP5K and PPP1CA (all down-regulated following reductions in insulin and IGF-1 levels).

Conclusions: This is the first study to suggest a direct link between insulin/IGF-1 signalling and changes in colon biology at the molecular level that are induced by weight loss and changes in insulin sensitivity.

Acknowledgements: This project was supported by a grant from Cancer Research UK (C1418/A14133) and an EPSRC Doctoral Prize Fellowship awarded to GC. Meal replacement products were supplied by Cambridge Weight Plan Ltd (Corby, United Kingdom).

Fibrinolysis Shutdown in Morbid Obesity: Tissue Plasminogen Activator Resistance and the Effects of Bariatric Surgery

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Introduction: Morbid obesity is associated with an increased risk of thrombotic events, including myocardial infarction and venous thromboembolism (VTE). This risk has been attributed to increased blood clot generation, and targeted with preemptive heparin prophylaxis after bariatric surgery. Despite this, some still have thrombotic complications, suggesting another contributory mechanism. In trauma, tissue plasminogen activator (tPA) resistance (termed fibrinolysis shutdown) is associated with VTE, multiple organ failure, and mortality. We hypothesize that morbidly obese patients are at risk for thrombotic events due to fibrinolysis shutdown.

Methods: Prospective data were obtained on 69 morbidly obese subjects undergoing bariatric surgery. Blood samples were obtained preoperatively ('Pre' group) on 46 patients and compared to 23 patients 6 months after weight loss surgery ('Post' group) and 137 healthy, non-obese subjects ('HS' group). Thromboelastography (TEG) assays were performed with and without the addition of tPA (150 ng/ml) to evaluate for resistance to fibrinolysis. TEG parameters include LY30 (fibrinolysis), alpha (fibrinogen function), and MA (platelet function). Data were analyzed using the Mann-Whitney test (two-tailed alpha 0.05).

Results: The Pre and Post groups had similar median age (41 vs 47 years), pre- op Body Mass Index (BMI) (44 vs 45), and gender (85% vs 88% female). BMI was reduced significantly in the Post group after surgery (31). The Pre group exhibited significantly reduced LY30 compared to the HS group (5.9% vs 53%; p < 0.0001). The Post group had increased LY30 compared to the Pre Group (15% vs 5.9% p = 0.002). Alpha and MA were not increased in the Pre group compared to HS and were not significantly different from the Post group (Alpha: 52 vs 56 degrees p = 0.33; MA: 62 vs 60 millimeters (p = 0.37).

Conclusion: Morbidly obese patients exhibit significant fibrinolysis shutdown. While surgical weight loss improves sensitivity to tPA mediated fibrinolysis, it does not completely correct the coagulation abnormality, which persists at least 6 months post-operatively. Additional clotting parameters related to platelets and fibrinogen function were similar to non-

obese subjects. These data suggest that the mechanism driving post-operative thrombotic complications in these morbidly obese patients is related to fibrinolysis resistance and may not be related to thrombin generation.

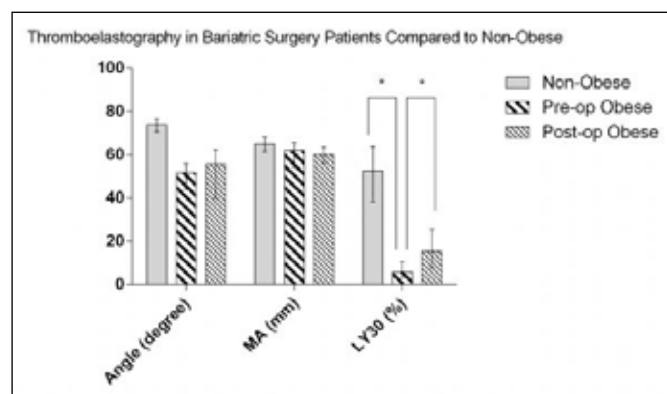


Fig. 1. A comparison of thromboelastography parameters between healthy individuals, morbidly obese patients prior to bariatric surgery, and morbidly obese patients 6 months after bariatric surgery. (* denotes $P < 0.05$)

OS11.07

Weight loss improves impaired muscle capillary recruitment in abdominally obese men: Effects on metabolic insulin resistance

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Background: Obesity is associated with impaired whole body glucose disposal (WBGD), and an increased risk of type 2 diabetes (T2DM) and cardiovascular diseases (CVD). In skeletal muscle, insulin normally increases the number of perfused capillaries, enhancing its own delivery and that of glucose to myocytes. Impairments in insulin-induced microvascular recruitment (MVR) may be responsible for the impaired WBGD in obese individuals. It is, however, unknown whether weight loss can restore MVR and whether this improves WBGD.

Methods: In a controlled trial with blinded analyses we randomized 53 non-smoking, abdominally obese men (waist circumference 102–110 cm; aged 18–65; no CVD or T2DM) to either an 8-week program (6 weeks low calorie diet (LCD), 2 weeks weight stable) or usual diet. During a 1 mU/kg/min euglycaemic insulin clamp we determined WBGD and MVR by means of contrast-enhanced ultrasound.

Results: Fifty men completed the study. Baseline BMI was 30.0 ± 1.7 kg/m² in the LCD group and 29.9 ± 2.5 kg/m² in the control group. LCD reduced BMI by 3.0 ± 0.8 kg/m² ($p < 0.001$), whereas BMI in controls did not change ($+0.1 \pm 0.4$ kg/m²). WBGD increased by 1.31 ± 1.22 mg/kg/min ($p < 0.001$) with LCD and was unaltered (-0.05 ± 0.86 mg/kg/min, $p = 0.761$) in controls. Also, MVR increased by $39.5 \pm 49.0\%$ ($p < 0.001$) in the LCD group, but was unchanged ($-0.3 \pm 28.2\%$, $p = 0.952$) in controls. Moreover, changes in MVR were associated with changes in WBGD ($r = 0.499$, $p < 0.001$).

Conclusion: We conclude that, in abdominally obese men, weight loss improves both MVR and WBGD. These changes are related to one another. These findings support the hypotheses that impaired vascular actions of insulin contribute to metabolic insulin resistance in overweight/obese individuals and that weight loss improves both.

OS11.08

Host-microbiota-environment interactions in calorie restriction: An integrative view of multi-dimensional data

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Background: Adipose tissue (AT) metabolism may be actively involved in the interplay between obesity co-morbidities and gut microbiota. Integrated data analysis approaches are warranted to better assess how host, environment and microbiota interact.

Objectives: Establish associations between changes in AT gene expression (GE) and groups of variables from host and environment during a 6-week calorie restriction (CR) period, with a specific focus on changes in insulin sensitivity (Fig1).

Materials/Methods: Overweight/obese adults ($N = 27$) undergoing a 6-week CR period were extensively phenotyped at baseline and week 6, including bioclinical parameters, and subcutaneous AT (sAT) GE (Illumina microarray). FunNet was used for functional annotation of sAT genes. Food and nutrient intake was measured with 7-day food records, and the Baecke questionnaire was used to assess physical activity (PA). Gut microbiota metagenomics species were characterized with shotgun metagenomics. A sparse partial least squares canonical method was used to determine the associations of change (week 6 – baseline) between groups of variables from host, microbiota and environment.

Results: First, changes in sAT GE were analyzed with respect to changes in host, gut microbiota, and environment. Markers of insulin sensitivity were the variables from host most strongly associated with changes in sAT GE. Furthermore, we found associations between changes in sAT GE and changes in microbiota abundance of species from genera including Akkermansia and Faecalibacterium, which have been previously linked with improved insulin sensitivity and reduced inflammation, respectively. Secondly, changes in insulin sensitivity were analyzed with respect to changes in gut microbiota, environment, and host. The variables associated most strongly with changes in insulin sensitivity included: PA, grains, milk, all macronutrients, phosphorus, iron, vitamins A and B12 (environment), species from Ruminococcus genus, among other genera (microbiota), and waist circumference, fat mass, adipocyte diameter, blood lipids, and inflammatory cytokines (host). Associations found between changes in sAT GE and microbiota did not overlap with those seen between microbiota and bioclinical parameters (Fig2).

Conclusion: Our results based on integrative analysis suggest that sAT may be an important link between microbiota and glucose homeostasis in the context of obesity and CR. Acknowledgement: ANR MICRO-Obes, KOT-Ceprodi, EU-METACARDIS (HEALTH-F4-2012-305312).



Fig. 1. Study of interaction between multiple elements from the host, microbiota and environment during a 6-week calorie restriction period in overweight/obese individuals.

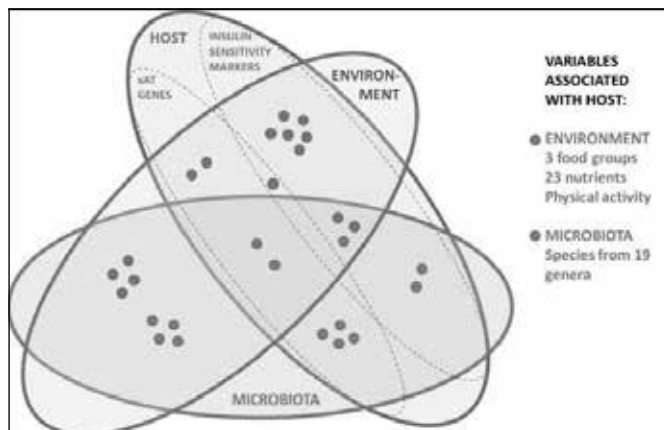


Fig. 2. A sparse partial least squares canonical method was used to identify associations between host, microbiota, and environment during a calorie restriction period. The number of dots in each overlapping region represents the degree of association between host with gut microbiota and environment.

OS12 – Obesity and (cardio)metabolic risk

OS12.01

The relative contributions of visceral fat and liver fat to insulin resistance and insulin secretion in men and women: The NEO study

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Aim: Abdominal obesity is associated with insulin resistance and type 2 diabetes. The aim of this study was to investigate the relative contributions of visceral fat and liver fat to insulin resistance and insulin secretion, and to what extent these associations differ between men and women. **Methods:** In this cross-sectional analysis of the Netherlands Epidemiology of Obesity study, visceral adipose tissue (VAT) was assessed by MRI in combination with ¹H-MR spectroscopy of hepatic triglyceride content (HTGC) in 2,076 participants. We performed linear regression analyses of VAT and HTGC with the Homeostasis Model Assessment (HOMA) of insulin resistance (IR) and β -cell function (B), adjusted for age, total body fat, ethnicity, education, alcohol consumption, smoking status, physical activity, dietary energy intake and hormonal therapy, and stratified by sex. **Results:** After exclusion of participants with glucose lowering therapy ($n = 88$), alcohol abuse ($n = 109$), and missing data ($n = 96$), 1,783 participants (55% women) were analyzed, with a mean and standard deviation (SD) of age: 55 (6) years, BMI: 26 (4) kg/m², VAT: 89 (52) cm², HTGC: 5.8 (7.6) %. In the multivariate joint model in men HOMA-IR was 14.5% (95% CI: 8.0–21.5) higher per SD of VAT, and 16.7% (10.0–23.7) higher per SD of HTGC. In women, HOMA-IR was 28.1% (17.2–40.0) higher per SD of VAT, and 9.8% (2.5–17.7) higher per SD of HTGC. In the multivariate joint model in men, HOMA-B was 4.0% (-2.3–10.8) higher per SD of VAT, and 7.5% (0.8–14.5) higher per SD of HTGC. In women, HOMA-B was 13.9% (4.3–24.3) higher per SD of VAT, and 2.2% (-2.5–7.1) higher per SD of HTGC.

Conclusion: In men visceral fat and liver fat were associated with insulin resistance to a similar extent, and not with insulin secretion. In women,

visceral fat was most strongly associated with insulin resistance. Women may be particularly susceptible to the metabolic effects of visceral fat. Future studies should aim at unravelling the underlying mechanisms of the metabolic effects of visceral fat accumulation in women.

OS12.02

Phospholipid transfer protein (PLTP) and metabolic diseases

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Background and Aim: Obesity and type 2 diabetes are metabolic diseases which constitute one of the biggest public health challenge of the 21st century. Their incidence continues to rise by epidemic proportions. Several clinical studies suggest a link between phospholipid transfer protein (PLTP) and metabolic diseases but this is still unclear and needs to be further investigated. In addition, we recently observed that mice deficient in PLTP, PLTP knockout mice (PLTP KO), developed metabolic alterations with age: impaired glucose metabolism as well as body fat accumulation. Our present study aims to clarify the role of PLTP in the onset of metabolic diseases.

Material/Methods: For this purpose, wild-type (WT) or PLTP KO mice were fed with high-fat diet (HFD, 60% kcal) or with the corresponding chow low-fat diet (LFD, 10% kcal) for four months.

Results: Our results showed that PLTP KO mice had a significantly increased body weight after only one week of HFD. However, energy balance (determined by total energy expenditure measurement, food intake and fecal lipid loss) was not different. It results in an excessive total body fat accumulation, hepatic steatosis or enhanced adipocytes size. In addition, PLTP KO mice displayed an impaired lipid clearance, glucose intolerance as well as insulin resistance. Finally, lipidomic analysis showed a highly altered lipidome by PLTP deficiency and diet. Lipidome alterations of PLTP KO mice were mostly attenuated by HFD except for ceramides plasma levels which remain elevated.

Conclusion: Our results confirmed the existence of a link between PLTP and metabolic diseases. Indeed, the absence of PLTP seems to alter the phenotype of WT mice with age. This effect is actually even more pronounced under high-fat condition.

Acknowledgement: This work was supported by a French Government grant managed by the French National Research Agency (ANR) under the program "Investissements d'Avenir" with reference ANR-11-LABX-0021-01- LipSTIC Labex. It has also received a BD & SFD allocation.

OS12.03

Mechanisms regulating insulin response to intragastric glucose in non-diabetic obese and lean subjects

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Background & Aims: Changes in blood glucose concentrations that result from a glucose challenge depend on the rate of gastric emptying, the rate of glucose absorption and the rate of insulin-driven metabolism including the incretins, glucose-dependent insulinotropic peptide (GIP) and glucagon-like peptide-1 (GLP-1). The rate of insulin-driven metabolism is clearly altered in obese subjects, but it is controversial which of these factors is predominant.

Objectives: The present study was designed to comprehensively analyze the various parameters regulating glycemia and quantify insulin, c-peptide, glucagon, glucose responses and gastric emptying rates, as well as in-

cretin hormone secretions during increasing glucose loads ranging from small (10 g) to standard (75 g) glucose loads.

Material and Methods: The study was conducted as a randomized, double-blind, parallel-group trial. A total of 12 normal weight and 12 non-diabetic obese (BMI > 30) participants took part in the study. Subjects received intragastric loads of 10 g, 25 g and 75 g glucose dissolved in 300 ml tap water enriched with ^{13}C -sodium acetate (for determination of gastric emptying rates).

Results: i) insulin resistance ($P < 0.001$) and hyperinsulinemia ($P < 0.001$), ii) decreased insulin disposal ($P < 0.001$), iii) trend for reduced incretin responses at 75 g glucose and unchanged GIP responses, and iv) increased fasting glucagon levels ($P < 0.001$) in obese subjects.

Conclusion: It seems that, rather than changes in incretin secretion, fasting hyperglucagonemia and consequent hyperglycemia play a role in reduced disposal of insulin, contributing to hyperinsulinemia and insulin resistance. In addition, the study established that increasing loads of glucose induce variations in the delivery of glucose to the duodenum with varying effects on blood glucose, insulin, c-peptide and incretin responses, both in lean and in obese subjects. We could show that even low glucose doses can be used for research purposes. The results are especially useful for designing experiments in patients after bariatric surgery, where only small glucose loads can be administered lest severe adverse events arise.

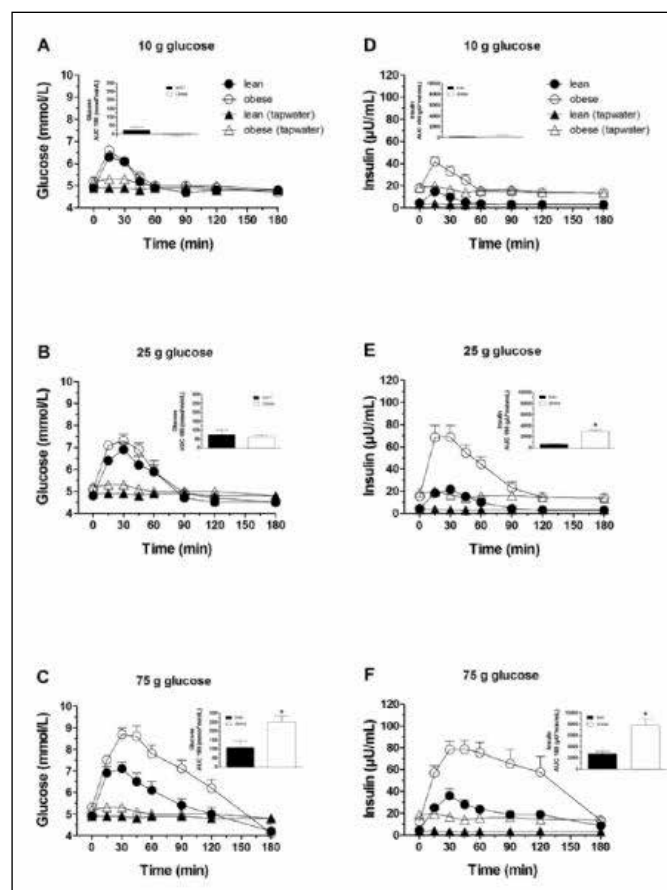


Fig. 1. Plasma glucose and insulin concentrations in response to intragastric loads of 10 g (A, D), 25 g (B, E) and 75 g (C, F) of glucose in lean and obese subjects. AUC, area under the concentration-time curve. Data are expressed as mean \pm SEM. *, $P \leq 0.05$, statistically significant difference vs. lean participants. N = 12 lean (6 men and 6 women) and 12 obese (6 men and 6 women).

OS12.04

Title: Ectopic fat and the phenotype of sarcopenic obesity in metabolically healthy and metabolically abnormal middle-aged women

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Background: Controversial findings emerged in metabolic health in obese subjects. The phenotype of metabolically healthy (MHO) and metabolically abnormal (MAO) obese subjects needs to be thoroughly described.

Objectives: To assess ectopic fat and the phenotype of sarcopenic obesity in women according with metabolic health status.

Material/Methods: Caucasian women (age > 18 years, BMI $\geq 30 \text{ kg/m}^2$) were recruited at the "Sapienza" University of Rome, Italy. Total and segmental body composition was assessed by DXA. Subcutaneous (SAT) and visceral adipose tissue (VAT), hepatic (HFF) and pancreatic fat fraction (PFF), thigh muscle cross-sectional area (CSA), intramuscular adipose tissue (IMAT) were determined by magnetic resonance (MR) imaging, and intramyocellular lipid content (IMCL) was assessed by MR spectroscopy. Handgrip strength was evaluated using a dynamometer. OGTT was performed and indices of insulin sensitivity and beta-cell function were calculated. High-sensitivity C-reactive protein (HsCRP) and vitamin D were measured. Obese subjects were classified as MAO or MHO according with the presence or absence of metabolic syndrome (MS) (NCEP-AT-PIII), respectively.

Results: 56 women were enrolled (age: 46.9 ± 11.9 years); 62.5% of subjects were MAO. Despite BMI and % body fat were not significantly different between MHO and MAO subjects (38.5 ± 7.1 vs $38.6 \pm 5.9 \text{ Kg/m}^2$, and 39.4 ± 3.6 vs $39.0 \pm 4.5\%$, respectively), VAT/SAT ratio was higher in MAO subjects (0.16 ± 0.07 vs 0.45 ± 0.62 , $p < 0.05$). PFF, HFF, thigh IMAT/thigh muscle CSA ratio, and IMCL were significantly increased. Handgrip strength divided by lean body mass was lower in MAO (0.51 ± 0.12 vs 0.38 ± 0.07). HOMA-IR and HsCRP were higher (1.9 ± 1.1 vs 3.6 ± 1.8 , and 3978 ± 74 vs $6381 \pm 74 \text{ ug/L}$, $p < 0.05$) and ISI-Matsuda was lower ($p < 0.05$) in MAO. HOMA- β and vitamin D were not different. Ectopic fat depots, indicators of sarcopenic obesity, and insulin resistance indices were significantly correlated.

Conclusion: Multiple tissues were infiltrated by fat in MAO. Muscle strength was affected by metabolic health. The disproportion in body compartments, especially relative sarcopenia, may play an additional role in mechanisms underlying metabolic and functional derangements in obesity.

OS12.05

Chronic intermittent hypoxia impairs insulin sensitivity but improves whole-body glucose tolerance by activating skeletal muscle AMP-activated protein kinase in mice

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Introduction: Obstructive sleep apnea syndrome is a highly prevalent disease in obese people resulting in chronic intermittent hypoxia (CIH). CIH is associated with insulin resistance and dysregulation of glucose homeostasis in both rodents and humans, although conflicting results persist in the literature. In the present study, we investigated the effects and underlying mechanism(s) of CIH on whole-body insulin sensitivity and glucose tolerance in mice.

Methods: C57Bl6/J male wild-type (WT) and AMPK α 2^{-/-} mice were exposed to CIH (1 min cycle, FiO₂ 21–5%, 8h/day) or normoxia during two weeks. Fasting plasma parameters, hepatic lipid composition, and whole-body insulin sensitivity and glucose tolerance were determined. Changes in various signaling pathways and expression of key metabolic/inflammatory genes were assessed in liver, skeletal muscle and white adipose tissue (WAT) by western blot and qPCR.

Results: CIH reduced food intake and body weight in mice. Blood glucose was not affected whereas plasma insulin level was increased by CIH, indicating systemic insulin resistance. In line with this, whole-body insulin sensitivity assessed by intraperitoneal insulin tolerance test was reduced in CIH mice. The insulin-induced phosphorylation of Protein Kinase B (PKB) and of some PKB downstream targets were also significantly reduced in liver, epididymal WAT and skeletal muscle, from CIH mice. Remarkably, CIH improved whole-body glucose tolerance, independently of changes in body weight, food intake and circulating insulin levels. This effect was associated with elevated Thr172-AMP-activated Protein Kinase (AMPK) phosphorylation in skeletal muscle, suggesting a tissue-specific AMPK-dependent increase in glucose uptake. Importantly, although CIH still affected food intake, body weight and systemic insulin resistance, its beneficial effect on whole-body glucose tolerance is abolished in AMPK α 2^{-/-} mice.

Conclusion: CIH impairs whole-body and tissue-specific insulin sensitivity while improving glucose tolerance by promoting skeletal muscle AMPK activation.

OS12.06

Restoring the circadian clock with melatonin can reduce thrombotic risk associated with obesity

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Background and Aims: Disruption of the internal circadian clock by modern lifestyles contributes to the continued rise in rates of obesity and diabetes along with cardiovascular disease, which remains a major cause of mortality in obesity due in part to thrombotic abnormalities and the development of dense fibrin clots that are more resistant to lysis. Melatonin is a hormone involved in the smooth running of the circadian cycle and studies have demonstrated cardioprotective properties of this hormone by mechanisms that remain unclear. Our aim was to study the in-vitro effect of melatonin on clot structure and function.

Methods: Clot function was assessed by validated turbidimetric assays through the addition of melatonin (0, 1, 10 and 100 nM) to purified human fibrinogen (4 μ M) and calculation of final turbidity and clot lysis. Clot structure was assessed by producing in vitro clots of fibrinogen and melatonin as above and visualised by scanning electron microscopy.

Results: Compared to control, an increase in final turbidity by melatonin treatment was demonstrated at all three concentrations (0.348 \pm 0.09 au, 0.450 \pm 0.12 au, 0.490 \pm 0.11 au and 0.479 \pm 0.12 au respectively, $p < 0.01$ for all compared to 0 nM) indicating the formation of thicker fibrin fibres which are generally easier to lyse. Time to full clot lysis in the absence of melatonin was 762 \pm 84 secs which was reduced at each concentration of melatonin (638 \pm 54 secs, 668 \pm 71 secs and 639 \pm 88 secs respectively, $p < 0.05$ for 1 nM only). Visualisation of the clots revealed that those made from melatonin-treated samples displayed larger pore size with thicker fibrin fibres, compared with clots not treated with melatonin (figure 1), consistent with the findings from the turbidimetric analysis, confirming that melatonin can modulate clot structure resulting in a less thrombotic phenotype.

Conclusion: Disruption of the circadian clock may predispose to obesity and cardiometabolic consequences. Supplementation with melatonin in-vitro ameliorates some of the thrombotic risk associated with obesity by producing clots that are less resistant to lysis.

OS12.08

Serum ceramides are linked to low microbiome richness and diabetes risk in overweight and obese subjects

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Background/Aim: Low gut microbiome richness, i.e. low vs. high metagenomic gene count (LGC vs. HGC), is associated with dyslipidemia and insulin resistance, yet these lipid perturbations are poorly understood.

Objectives: Ceramides (Cer), which can induce insulin resistance, and sphingomyelins (SM) are important components of the human lipidome, therefore we tested whether these circulating sphingolipids would link LGC to increased diabetes risk.

Material/Methods: 49 participants (41 women) had previously undergone extensive clinical phenotyping. Serum samples were analyzed by HPLC-MS/MS to quantify 45 molecular Cer and SM. Employing quantitative metagenomics, participants were characterized as LGC/HGC and bacterial abundance quantified as metagenomic species (MGS).

Results: Confirming previous reports, Cer were inversely associated with fasting and OGTT-derived measures of insulin sensitivity ($r = -0.31$ and -0.32 , $p \leq 0.05$). Furthermore, Cer were also associated with fasting glucose ($r = 0.39$, $p = 0.006$) and the OGTT-derived ISSI-2 ($r = -0.4$, $p = 0.01$), suggesting lower beta cell function. Establishing a link to gut dysbiosis, SM and Cer were elevated in LGC by 13% ($p = 0.03$) and 30% ($p = 0.007$), respectively. Longer acyl-chain Cer, including Cer(d18:1–26:1) and Cer(d18:1–24:1), were the most elevated molecular lipids. 44 MGS were decreased in LGC relative to HGC ($\text{fdr} < 10\%$). Numerous Cer but fewer SM were strongly associated with the depletion of 9 MGS in particular ($\text{fdr} < 10\%$), which included *P. capillosus*, *M. smithii*, and a *ruminococcus* species. Parsing of the metagenomics data into metabolic functions combined with serum and urine metabolomics provide further insights into the mechanistic link between altered gut microbiota and elevated host Cer.

Conclusions: Our data establish a new link between gut microbiota richness, Cer, and diabetes risk in overweight/obese humans. If confirmed, rescuing specific bacteria or pathways whose depletion associates with elevated host Cer may provide a new therapeutic target for preventing the development of type 2 diabetes. **ACKNOWLEDGEMENTS:** This work was supported by Agence Nationale de la Recherche (ANR MICRO-Obes), KOT-Ceprodi, the association Fondation Coeur et Arteres, and the European Union's Seventh Framework Program Metacardis.

POSTER PITCHES

Thursday, 2 June, 2016

PP1 – Basic Science and Experimental Approaches

PP1.01

Alex3, a member of the Armcx family of proteins: A novel actor in the control of energy homeostasis

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Alex3 is a member of the Armcx family of proteins encoded by an array of armadillo (Arm) repeat-containing genes located on the X chromosome. Alex3 localizes to the mitochondria, controls mitochondrial dynamics and trafficking, influences the Wnt/beta-catenin intracellular pathway and has been proposed as a putative tumor suppressor. Originally, the functional role of this protein was established in the nervous system. We found that Alex3 is expressed in peripheral tissues, such as liver, white (WAT) and brown (BAT) adipose tissues. Treatment of mice with a high fat diet caused a rise in the hepatic expression of Alex3, whereas an opposite down regulation was found in response to starvation, thus indicating a strong regulation of Alex3 in response to nutritional factors. This regulation in response to nutritional factors was similar for the expression of the other members of the Armcx family. In order to explore the role of Alex3, we developed mice in which Alex3 expression had been knocked down via siRNA injection to embryos. Mice with abnormally impaired Alex3 expression developed obesity spontaneously, showing hypertrophy of white adipocytes both at the visceral and subcutaneous WAT depots. Accordingly, systemic levels of insulin were increased despite mild hyperglycemia, thus indicating insulin resistance. This was accompanied by impaired thermogenic activity of BAT as assessed by reduced heat production (thermography of interscapular BAT area) and lowered expression of thermogenic genes (UCP1, PGC-1 α , Dio2). Moreover, there was hepatic steatosis (lipid droplet accumulation in hepatocytes, as assessed by light microscopy) and signs of hepatic lipotoxicity, as assessed by gene expression data. These data indicate that Alex3 plays a role in the control of energy metabolism and elicits disturbances leading to obesity and hepatic lipotoxicity. Alex3 appears as a novel intracellular actor in the control of energy balance. The dual role of Alex 3 as a tumor suppressor and controller of hepatic steatosis and adiposity makes it worthwhile study to explore the relationship between obesity, hepatic lipotoxicity and cancer.

PP1.02

Aldosterone is not associated with insulin-mediated microvascular recruitment and insulin sensitivity in abdominally obese, but otherwise healthy men

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Background & Aims: Increased aldosterone levels have been implicated in the pathogenesis of obesity-associated insulin resistance, which may be partly attributable to aldosterone synthesis in adipocytes¹. We hypothesized that aldosterone-induced impairment of insulin-mediated skeletal muscle microvascular recruitment contributes to the insulin resistant state as observed in obesity.

Objectives: To investigate whether aldosterone levels are related to insulin-mediated muscle microvascular recruitment and insulin sensitivity in lean and abdominally obese men, and whether improvement of muscle microvascular function and insulin sensitivity following weight loss might be explained by reduced aldosterone levels.

Material and Methods: In 25 lean (age (mean \pm SD) 47 \pm 18 years) and 53 abdominally obese (age 50 \pm 13 years), otherwise healthy men, renin and aldosterone levels were measured with ELISA. Insulin-mediated microvascular recruitment (IMMR) in forearm skeletal muscle and glucose infusion rate (GIR; measure of insulin sensitivity) were assessed by means of contrast-enhanced ultrasound before and during a hyperinsulinaemic clamp. The abdominally obese men were randomized to an 8-week weight loss intervention or their habitual diet. Thereafter, measurements of renin, aldosterone, IMMR, and GIR were repeated.

Results: IMMR and GIR were lower in the abdominally obese as compared to the lean men (IMMR (mean \pm SD): lean 44 \pm 41%, obese -3.9 \pm 27%, $p < 0.01$; GIR: lean 6.8 \pm 1.8 mg/kg/min, obese: 4.0 \pm 1.3 mg/kg/min, $p < 0.01$). Aldosterone and renin levels were not different between both groups (aldosterone (median [IQR]): lean 225 [176–316] pg/mL, obese 234 [170–315] pg/mL, $p = 0.71$; renin: lean 671 [519–872] pg/mL, obese 615 [535–786] pg/mL, $p = 0.30$). Aldosterone levels did not correlate with IMMR or insulin sensitivity. In the weight loss group, waist circumference decreased, and IMMR and GIR improved significantly compared to the weight stable group. Aldosterone and renin levels, however, remained unchanged.

Conclusion: Our data suggest that in abdominally obese, but otherwise healthy men, aldosterone does not contribute to the development of muscle microvascular dysfunction and insulin resistance. Possibly, the role of aldosterone becomes more prominent with increasing severity of obesity.

Reference:

1 Bender et al. Diabetes 2013.

Acknowledgements: None

PP1.03

Obesity-associated alterations of glucose metabolism are ameliorated after chronic stimulation of abdominal vagus nerve

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Introduction: Obesity alters glucose metabolism with specific reference to insulin resistance. We have previously demonstrated that chronic stimulation of abdominal vagus nerve (VNS) was able to restore insulin sensitivity in obese animals (Malbert et al, Obesity facts, 2015). The aim of this study is to evaluate the capability of vagal stimulation to recover the altered glucose metabolism induced by obesity.

Methods: 15 adults age-matched minipigs were divided into three groups: lean (33 ± 1.6 kg), obese (49 ± 1.1 kg) and obese with VNS (47 ± 1.3 kg). Obesity was induced by 3 months of obesogenic diet. Once obese, the obese and obese-stimulated groups were fitted with cuff electrodes around the abdominal vagi using laparoscopy. VNS was applied in obese-stimulated group only. Obese and obese-stimulated groups were tested after 5 months of obesogenic diet whereas lean group remained on normal diet. Oxidative and non oxidative glucose metabolism were evaluated using indirect calorimetry coupled with euglycemic clamp. Brain, hepatic and skeletal muscle metabolism were quantified as insulin-mediated glucose uptake using FDG dynamic PET imaging coupled with continuous arterial input function measurement also during clamp. Brain glucose uptake was obtained by kinetic modeling of PET and arterial data whereas hepatic and skeletal muscle glucose uptake were calculated using Patlak method.

Results: Glucose oxidative metabolism was unchanged in lean, obese and obese-stimulated animals ($p > 0.05$). On the contrary, non oxidative glucose metabolism was significantly reduced by obesity and partially restored by VNS (4.5 ± 0.65 , 2.9 ± 0.26 and 4.1 ± 0.19 mg/kg/min for lean, obese and obese stimulated, $p < 0.01$). Whole brain glucose metabolism was also reduced by obesity, a feature restored by VNS to lean condition (Table). ROI based analysis showed that this pattern was similar in all brain areas (Figure). Liver and skeletal muscle glucose metabolism followed the same trend.

Conclusions: Chronic vagal stimulation was able to restore whole body glucose metabolism altered by obesity. This restoration was equally effective on the main organs involved in glucose metabolism e.g. brain, liver and skeletal muscle demonstrating that restoration of insulin sensitivity by VNS was organ independent.

Brain CMRglu

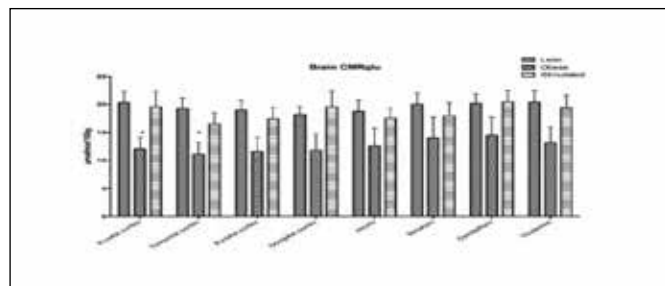


Fig. 1. The reduction of insulin-stimulated brain glucose metabolism observed in obese condition was observed over all brain areas. The restoration of glucose uptake by VNS was effective all over the brain.

Table 1. Whole body sensitivity and brain, liver, skeletal muscle glucose uptake in lean, obese and VNS conditions

* Significantly different from Lean at $p < 0.01$ § Significantly different from Obese at $p < 0.01$ No data were significantly different between Lean and obese-stimulated

	Lean	Obese *	Obese-Stimulated §
Whole body Insulin sensitivity ($\mu\text{U}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}$)	6.4 ± 0.25	4.2 ± 0.37	5.2 ± 0.23
Brain glucose uptake ($\mu\text{moles}\cdot\text{min}^{-1}\cdot 100\text{g}^{-1}$)	19.1 ± 1.71	11.9 ± 2.64	18.4 ± 2.14
Hepatic glucose uptake ($\mu\text{moles}\cdot\text{min}^{-1}\cdot\text{ml}^{-1}$)	0.024 ± 0.0205	0.016 ± 0.0017	0.024 ± 0.0020
Skeletal muscle glucose uptake ($\mu\text{moles}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}$)	43.5 ± 7.38	35.3 ± 2.07	44.8 ± 5.35

PP1.04

Antioxidant treatment suppresses $\beta 3$ -adrenergic receptor agonist-induced browning of adipose tissue

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A key question in the field of metabolic research is whether and how one can improve the functionality of obese adipose tissue. A promising strategy in this regard is stimulation of β -adrenergic pathways locally in adipose tissue, which leads to browning i.e. formation of beige adipocytes that have increased mitochondrial density. The mechanism underlying β -adrenergic signaling-induced browning is however not fully understood, but it involves increased levels of free fatty acids and inflammation. Here, we aim to identify the potential role of reactive oxygen species (ROS) in the browning process. Adult male C57/Bl6 mice were pretreated with the antioxidant N-acetylcysteine (NAC). They were injected daily with CL316,243 (CL), a selective $\beta 3$ -adrenergic receptor agonist. Following 3h (acute), 24h or 10 days (chronic) of treatment, blood and adipose tissues were collected for further analysis. ROS production was analyzed in cultured adipocytes treated with or without NAC and/or CL. CL administration increased both the mRNA levels of browning markers (such as uncoupling protein 1 (UCP-1) and type II iodothyronine deiodinase (DIO2)) and the mitochondrial density, as judged by combined CARS (Coherent Anti-Stokes Raman Scattering) and fluorescence microscopy of subcutaneous inguinal white adipose tissue. These CL effects were significantly reduced by NAC pretreatment. The acute effect of CL on lipolysis in vivo was however unaffected by NAC. CARS analysis of brown adipose tissue after chronic treatment showed no effect of CL on mitochondrial density. To our surprise, there was however a significant reduction in mitochondrial density in NAC-treated animals. In cultured adipocytes, we demonstrate that CL induces increased ROS production. This boost in ROS production appears to originate primarily from non-mitochondrial sources and is significantly reduced by NAC pretreatment. In summary, these data show that NAC treatment reduces CL-induced browning and suggest that ROS-mediated signaling is important for mitochondrial biogenesis in white and brown adipose tissue.

PP1.05

A candidate-based RNAi screen identifies regulators of adiponectin secretion in primary human adipocytes

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Enlarged white adipose tissue (WAT) mass in obesity is associated with the development of insulin resistance, type 2 diabetes mellitus (T2DM) and cardiovascular complications. Data in recent decades have demonstrated that WAT is an endocrine organ secreting numerous peptide hormones collectively termed adipokines. Adiponectin is an adipokine exclusively secreted from WAT and data in murine models have demonstrated direct insulin sensitizing effects on peripheral organs. Adiponectin secretion is attenuated in obesity which makes it an interesting therapeutic target against obesity-associated insulin resistance. We aimed to identify novel regulators of adiponectin secretion using a candidate-based functional RNAi screen in human primary in vitro differentiated adipocytes. The candidate gene selection was based on global transcriptional profiling of WAT from lean and obese subjects and the association with relevant parameters including insulin sensitivity and adipocyte phenotypes. Genes already described in the literature were excluded. This resulted in a total

of 125 candidate genes that were individually down-regulated in human primary adipocytes differentiated in 96-well plate format. Alterations in adiponectin secretion upon RNAi treatment were quantified in the conditioned media. Genes of potential clinical relevance were defined as inducing significant changes in adiponectin secretion (Z-score score $> \pm 1$) upon RNAi treatment combined with congruent changes in gene expression in obese subjects. We identified 15 clinically relevant novel regulators of adiponectin secretion which encompass enzymes, receptors and membrane bound transporters. These factors are currently being evaluated in more detail.

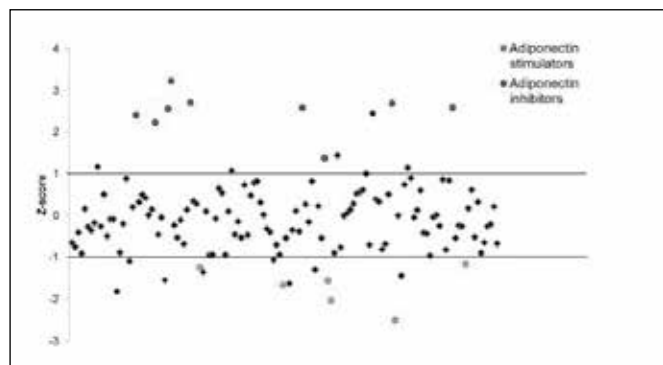


Fig. 1. An overview of the RNAi screen. Each gene is denoted by a dot/diamond. Significant adiponectin regulators (defined as z-score $> \pm 1$) with congruent alterations in adipose tissue expression in obesity are shown as red or blue dots.

PP1.06

Baseline subcutaneous adipocyte volume associates with improvements in pulse wave velocity following significant weight loss

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Background and Aims: A recent meta-analysis determined that weight loss reduces pulse wave velocity (PWV), a clinical marker of arterial stiffness. We have previously shown in a cross sectional study that, in obese subjects, visceral fat cell volume was the only white adipose tissue (WAT) parameter that correlated to PWV. Here we investigate whether subcutaneous or visceral fat cell volume or number could predict improvements in arterial stiffness following long-term weight loss.

Material/Methods: A prospective cohort of 120 obese subjects. Examinations were performed before and two years after Roux-en Y gastric bypass surgery. These included anthropometric measures, blood samples for routine clinical chemistry, WAT biopsies from subcutaneous and visceral fat to calculate fat cell number and volume and dual-x ray absorptiometry for fat mass and distribution. Arterial stiffness was determined as aortic PWV using an Arteriograph®.

Results: In an interim analysis of 85 participants, subjects lost on average 22.35 Kg. Two years after surgery PWV was significantly lower (8.358 vs 7.642m/s; $P = 0.001$ 95% CI diff.319–1.117). Linear regression analysis showed that baseline subcutaneous fat cell volume ($P = 0.008$) correlated significantly with improvements in PWV. No other baseline WAT parameter (subcutaneous cell number, omental cell volume and number) was significantly associated with a decrease in PWV. In multiple regression analyses, subcutaneous fat cell volume remained significant when adjusting individually for systolic BP, diastolic BP, body mass index (BMI) and total fat mass. The relationships between PWV and BMI or total fat, re-

spectively became non-significant when controlling for subcutaneous fat cell volume (see table 1).

Conclusion: In obese subjects, baseline subcutaneous fat cell volume, independently of BMI or total fat mass, was the only baseline WAT parameter that associated with improvements in arterial stiffness following long-term pronounced weight loss. This, together with other recently published data, suggest that determination of subcutaneous fat cell volume could help identify subjects where weight loss may be particularly beneficial.

Table 1 Influence of co-variable on the relationship between subcutaneous fat cell volume and pulse wave velocity				
Subcutaneous fat cell volume		Co variable		
Std Beta	P-value	Co-variable	Std Beta	p-value
.235	.034	BMI	.186	.092
.234	.029	Systolic BP	.252	.019
.281	.008	Diastolic BP	.211	.045
.236	.036	Total fat mass	.166	.136

Table 1.

PP1.07

Water soluble fraction of environmental particles induces mitochondrial dysfunction in macrophages followed by adipocyte dysfunction

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Introduction: Exposure to fine particulate matter air pollution negatively affects human health, but a possible connection with obesity-associated morbidity remains uncertain. Air-pollution-derived compounds may activate immune cells that could then engage in an interaction with adipocytes and contribute to adipose dysfunction. Here we assessed whether immuno-metabolic changes in macrophages exposed to water extracts from diesel exhaust particles (DEP) induce adipocyte dysfunction.

Methods: RAW264.7 macrophages were treated with water extracts of 2 standard DEP with high/low organic compounds content (SRM-1650/2975). Conditioned medium (CM) was collected, and used to expose cultured-adipocytes for 6h. Macrophages' oxygen consumption rate (OCR) was measured by Seahorse-XFe-24.

Results: Adipocytes exposed to CM of untreated macrophages exhibited a decreased insulin-stimulated p-Akt/T-Akt and p-Gsk/T-Gsk, and elevated basal lipolysis, compared to control adipocytes. When CM was prepared from macrophages pre-treated with SRM-2975, but not SRM-1650, a further decline in insulin responsiveness was observed. Lipolysis was not further altered. Macrophages' TNF α , IL-10 and IL-6 secretion indicated that these common cytokines were unlikely mediators in this system. This finding suggests involvement of other mediators, or metabolic changes in the immune cells that do not manifest in changes in secretion of common inflammatory cytokines. To this end, already 2h exposure of macrophages to water extracts of SRM-2975, but not SRM-1650, resulted in significant decrease in maximal OCR, without affecting mitochondrial uncoupling. This could not be explained by decreased mitochondrial content, or by expression of mitochondrial respiratory chain proteins, suggesting an acute, functional interference of compounds from SRM-2975 with macrophage mitochondrial respiration.

Conclusion: Results support a potential mediatory role for macrophages in the induction of adipocyte insulin resistance by air pollution particles. Furthermore, it exemplifies that different samples from one type of environmental source may induce different immune-metabolic outcomes that associate with adipocyte dysfunction.

PP1.08

65 years of longitudinal change in birth weight

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Objectives: Birth weight (BW) is an indicator of fetal development and is associated with future health outcomes. Both high and low BW has been identified as risk factors for adult morbidity. An increasing BW has been reported in Europe and North America during the last 40 years, and it has been linked to the growing obesity epidemic. Our aim was to explore the longitudinal trends of BW during 65 years 1946–2011.

Material & Methods: In Sweden, Child Health Care (CHC) centers follow all children regarding growth and general health. We have collected detailed CHC growth data including BW from centrally archived records for all children born 1945 or later in Gothenburg and established a unique population-based cohort, the BMI Epidemiology Study (BEST) (n=400,000). The overall aim of the well-powered BEST cohort is to determine the role of childhood obesity for a variety of diseases later in life. BW of the 400 consecutively first born boys every fifth year from 1946–2011 constitute the 14 birth cohorts included in the present BEST sub-study (n = 5,600).

Results: The mean BW in the complete study cohort (n = 5,600) was 3,553 ± 574 g. Linear regression analysis between year of birth and mean birth weight was stable during the period (BETA = -0.001 kg/year, p = 0.003). The 5th, 95th, and the 99th percentiles were also stable during this period. Controlling for country of birth did not alter the results.

Conclusion: We demonstrate that BW has been stable during the last 65 years with small periodic fluctuations in mean BW, 5th, 95th, and 99th percentiles. Our findings indicate that the obesity epidemic is not related to an increase in BW.

	Mean	SD	Percentiles						
			5	10	25	50	75	90	95
1946	3,6082	.56300	2,6000	2,9020	3,2625	3,6000	3,9800	4,3180	4,5990
1951	3,6101	.54189	2,7225	2,9610	3,2600	3,5900	4,0000	4,2800	4,5000
1956	3,5708	.66846	2,5620	2,8630	3,2700	3,5820	3,9575	4,2190	4,3900
1961	3,5407	.55489	2,6005	2,8110	3,1425	3,5000	3,9100	4,1880	4,4000
1966	3,5268	.55203	2,6905	2,8620	3,2000	3,5300	3,8975	4,2000	4,4000
1971	3,6099	.58413	2,8010	2,8520	3,2025	3,5950	3,9975	4,3480	4,5690
1976	3,5195	.58326	2,5225	2,8210	3,1500	3,5300	3,9000	4,2370	4,4895
1981	3,5382	.56022	2,5605	2,8520	3,2225	3,5350	3,9238	4,1700	4,3695
1986	3,5732	.58010	2,6810	2,9300	3,2100	3,5550	3,9500	4,2490	4,4980
1991	3,5864	.59710	2,5050	2,9100	3,2300	3,6200	3,9675	4,3300	4,5100
1996	3,5530	.61379	2,4810	2,8305	3,1738	3,5750	3,9438	4,3045	4,5050
2001	3,5268	.57068	2,5500	2,8580	3,2100	3,5250	3,9050	4,1995	4,4240
2006	3,5044	.55513	2,5615	2,8900	3,1750	3,5500	3,8575	4,1885	4,3200
2011	3,5073	.62718	2,5600	2,8350	3,1800	3,5200	3,8700	4,2450	4,4090

Table 1. Birth weight distribution

The 400 first born boys from the population based cohort of BMI Epidemiology Study (BEST) Gothenburg every fifth year from 1946–2011 constitute the 14 birth cohorts.

PP1.09

Brain reward activity is not associated with body weight and body composition – a PREVIEW study

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Obesity is one of the most important predisposing factors for the development of type 2 diabetes (T2D). The PREVIEW-project (EU-FP7-nr. 312057) has been initiated to identify the most effective lifestyle in the prevention of T2D in a group of overweight, pre-diabetic subjects. Differences in brain reward activity have been found comparing normal weight and obese subjects. It is not clear if those differences precede the development of obesity or if they are a long-term consequence of weight gain. In a sub-cohort of the PREVIEW-study, the role of body mass, body composition and metabolic parameters for brain-reward activation in 41 obese, pre-diabetic subjects (m/f: 24/17; BMI: 32.3 ± 3.4; HOMA-IR: 3.9 ± 1.8) was assessed. Blood oxygen level dependent responses to randomized blocks of food and non-food images were measured with fMRI (3Tesla). Body mass, body composition, fasting insulin and glucose were determined before brain scanning procedures at baseline. Anterior Cingulate Cortex (ACC) (p < 0.001, t(36) = 4.13), Middle Frontal Gyrus (MFG) (p < 0.001, t(36) = 4.64) and Insula (INS) (p < 0.001, t(36) = 5.04) showed greater activity in response to food images compared to non-food images. Activation was not associated with body mass, fat mass or fat mass percentage. Activation was positively associated with fasting Insulin (ACC r = 0.45, p < 0.01). Body weight or composition did not show any association with brain reward activity in overweight, pre-diabetic individuals but proximal measures of insulin-sensitivity did.

PP1.10

Ghrelin changes food preference from high fat diet to chow in schedule-fed rats

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Ghrelin is a gut peptide released from the empty stomach that increases food intake. It has also been linked to food-related behaviours such as food motivation, food reward and food anticipatory activity. Ghrelin levels in the blood are linked to meal pattern, increasing prior to feeding. To mimic human meal eating behaviour in animals we used a scheduled feeding (SF) paradigm in which rodents have ad libitum access to chow and in addition 2h access to highly palatable high fat diet (HFD). Previous studies with this paradigm have shown that both rats and mice will rapidly adapt their feeding behaviour and as a result binge-eat on HFD. Here we sought to investigate the role of ghrelin during binge-like meal eating induced by SF. We utilised a combination of two different animal models: pharmacologically manipulated rats via acute administration of ghrelin or genetically modified mice lacking the growth hormone secretagogue receptor 1A (GHS-R1A). For acute injections of either ghrelin or vehicle into the lateral ventricle (ICV) or intra-VTA, rats were surgically implanted with guide cannulas and then habituated to SF for at least 2 weeks prior to injections. GHS-R1A-KO mice and their wildtype (WT) littermates were scheduled-fed for 4 weeks. Remarkably and unexpectedly, we found that acutely injecting ghrelin ICV or intra-VTA resulted in a shift in food preference from high fat diet towards chow during the SF period without altering total daily energy consumption. However an increase of body weight was observed after ICV ghrelin. A fasting chal-

lenge also led to an increase in chow intake during the SF session but HFD intake did not reduce at the same time. GHS-R1A-KO mice were able to adapt and maintain large meals of HFD in a similar fashion as WT mice suggesting that the ghrelin signalling system may not have a critical role in acquisition or maintenance in this kind of feeding behaviour. In conclusion, ghrelin appears to act as a modulating factor for binge-like eating behaviour by shifting the food preference towards a healthier choice (from HFD to chow), effects that were clearly divergent from fasting. Supported by EC (Nudge-it, 607310).

PP1.11

Centrally administered ghrelin acutely influences food choice in rodents

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We sought to determine whether the orexigenic hormone, ghrelin, is involved in the intrinsic regulation of food choice in rats. Ghrelin would seem suited to serve such a role given that it signals hunger information from the stomach to brain areas important for feeding control, including the hypothalamus and reward system (e.g. ventral tegmental area, VTA). Thus, in rats offered a choice of palatable foods (sucrose pellets and lard) superimposed on regular chow for 2 weeks, we explored whether acute central delivery of ghrelin (intracerebroventricular (ICV) or intra-VTA) is able to redirect their dietary choice. The major unexpected finding is that, in rats with high baseline lard intake, acute ICV ghrelin injection increased their chow intake over 3-fold, relative to vehicle-injected controls, measured at both 3 hr and 6 hr after injection. Similar effects were observed when ghrelin was delivered to the VTA, thereby identifying the VTA as a likely contributing neurobiological substrate for these effects. We also explored food choice after an overnight fast, when endogenous ghrelin levels are elevated, and found similar effects of dietary choice to those described for ghrelin. These effects of fasting on food choice were suppressed in models of suppressed ghrelin signaling (i.e. peripheral injection of a ghrelin receptor antagonist to rats and ghrelin receptor (GHSR) knock-out mice), implicating a role for endogenous ghrelin in the changes in food choice that occur after an overnight fast. Thus, in line with its role as a gut-brain hunger hormone, ghrelin appears to be able to acutely alter food choice, with notable effects to promote “healthy” chow intake, and identify the VTA as a likely contributing neurobiological substrate for these effects.

PP1.12

A Difference in Fatty Acid Composition of Isocaloric High-Fat Diets Alters Metabolic Flexibility in Male C57BL/6JOLAhsd Mice

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Poly-unsaturated fatty acids (PUFAs) are considered to be healthier than saturated fatty acids (SFAs), but others postulate that especially the ratio of omega-6 to omega-3 PUFAs (n6/n3 ratio) determines health. Health can be determined with biomarkers, but functional health status is likely better reflected by challenge tests that assess metabolic flexibility. The aim of this study was to determine the effect of high-fat diets with different fatty acid compositions, but similar n6/n3 ratio, on metabolic flexibility. Therefore, adult male mice received isocaloric high-fat diets with either predominantly PUFAs (HFpu diet) or predominantly SFAs (HFs diet) but similar n6/n3 ratio for six months, during and after which several biomarkers for health were measured. Metabolic flexibility was assessed by

the response to an oral glucose tolerance test, a fasting and re-feeding test and an oxygen restriction test (OxR; normobaric hypoxia). The latter two are non-invasive, indirect calorimetry-based tests that measure the adaptive capacity of the body as a whole. We found that the HFs diet, compared to the HFpu diet, increased mean adipocyte size, liver damage, and ectopic lipid storage in liver and muscle; although, we did not find differences in body weight, total adiposity, adipose tissue health, serum adipokines, whole body energy balance, or circadian rhythm between HFs and HFpu mice. HFs mice were, furthermore, less flexible in their response to both fasting- re-feeding and OxR, while glucose tolerance was indistinguishable. To conclude, the HFs versus the HFpu diet increased ectopic fat storage, liver damage, and mean adipocyte size and reduced metabolic flexibility in male mice. This study underscores the physiological relevance of indirect calorimetry-based challenge tests.

PP1.13

Adipocytokines-autophagy crosstalk in adipose tissue and adipocytes – relevance to adipose tissue dysfunction in obesity

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Background/Objectives: Adipose tissue (AT) dysfunction is characterized by altered autophagic activity and pro-inflammatory adipocytokines secretion profile. The objective of this study was to evaluate the bi-directional regulation of obesity-associated changes in adipocytokines profile and dysregulated AT autophagy. Subjects/

Methods: In n = 186 human adipose tissue samples we assessed clinical associations between human visceral AT autophagy gene expression and circulating adiponectin, leptin and IL-6, by multivariate models. We used an adipo-cytokine array to assess the effect of autophagy inhibition (with Bafilomycin-A1 or Atg7-siRNA) in mouse adipose tissue and cells. Complementarily, the effect of adipocytokines on autophagy gene expression was assessed in human adipocyte cell line (chub-s7).

Results: Circulating adiponectin, leptin and IL-6 levels were associated with human omental-AT expression of ATG5 mRNA, associations that remained significant (beta=-0.330, p < 0.001; beta=0.344, p < 0.001; beta=0.298, p < 0.001, respectively) in a multivariate model adjusted for age, sex and BMI. Bafilomycin-A1 pre-treatment of AT explants from high fat fed (HFF) mice had no effect on the secretion of some adipose tissue-derived endocrine factors, but partially or fully reversed obesity-related changes in secretion of a sub-set of adipo-cytokines by >35%, including the obesity-associate up-regulation of IL-6, VEGF and TNFα, and the down-regulated secretion of IL-10 and adiponectin. Similarly, siRNA-mediated knockdown of ATG7 increased adiponectin secretion from cultured adipocytes, and partially reversed changes in adiponectin and leptin secretion induced by TNFα+IL-1β. In differentiated human pre-adipocytes progranulin and more robustly – leptin, but not chemerin, increased autophagy gene expression.

Conclusions: Increased AT autophagy is associated with pro-inflammatory adipocytokines profile which alternatively may lead to increased autophagic activity.

Plasma levels of retinol binding protein (RBP-4) in relation to metabolic syndrome components in elderly subject

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Introduction: Retinol-binding protein 4 (RBP-4) is a plasma vitamin A carrier that delivers retinol from the liver to peripheral tissues, and one of adipokines that participates in the development of insulin resistance, by impairment insulin signaling at receptor and postreceptor levels, as well as stimulation of liver gluconeogenesis. The major sources of RBP-4 in humans are adipocytes and hepatocytes. The aim of the study was to evaluate the relationship between plasma levels of RBP-4 and the prevalence of metabolic syndrome components and its number in elderly subjects. **Material:** The study included 3382 people aged 65 years and over, the Pol-Senior study participants. Glucose, cholesterol and its fractions, serum triglycerides, and RBP-4 plasma concentrations were assessed. Metabolic syndrome was diagnosed on the basis of the IDF 2009 criteria.

Results: Visceral obesity was diagnosed among 2763 (81.7%) respondents, systolic blood pressure ≥ 135 mmHg or diastolic blood pressure ≥ 85 mmHg or treated hypertension in 3021 (89.3%), low HDL cholesterol or the use of statins in 1730 (51.2%), hypertriglyceridemia, or use of fibrates in 889 (26.3%), glucose concentration ≥ 100 mg/dl or type 2 diabetes in 1466 (43.3%). RBP-4 plasma concentrations were higher in patients with visceral obesity ($p < 0.01$), elevated blood pressure values ($p < 0.001$), hypertriglyceridemia ($p < 0.001$) and glucose metabolism disturbances ($p < 0.001$). RBP-4 concentration in plasma increased ($p < 0.001$) with the number of components of the metabolic syndrome: 0 – 35.6 (25.9–52.7); 1 – 37.6 (26.0–54.5); 2 – 38.9 (28.1–53.4); 3 – 41.0 (29.5–58.5); 4 – 44.3 (30.6–61.3); 5 – 44.1 (31.5–64.5) ng/ml.

Conclusions: There is a correlation between plasma levels of RBP-4 and the prevalence of metabolic syndrome and the number of its components in the elderly population.

Postprandial modifications of oxidative stress and mRNA expression in subjects with abdominal obesity

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Introduction: Insulin resistance and oxidative stress are related to increased atherosclerosis. Our aim was to analyze levels of oxidative stress and lympho-monocytes mRNA expression profile in subjects with abdominal obesity and healthy controls as well as the influence of an oral unsaturated fat load test in both oxidative stress status and mRNA profile.

Methods: We included 20 subjects with abdominal obesity (waist circumference > 102 cm for men and > 88 cm for women; fasting plasma glucose < 126 mg/dl) and 20 healthy controls (waist circumference < 102 cm for men and < 88 cm for women; fasting plasma glucose < 100 mg/dl; total cholesterol < 200 mg/dl, and triglycerides < 150 mg/dl). After 12 hours of fasting we performed a standardized oral fat load test (OFLT 0–8 hours) with Supracal® (50 g/m²). mRNA was analyzed by Illumina system iScan.

Results: the subjects with abdominal obesity showed significant higher levels of basal HOMA (1.1 ± 0.6 vs 4.6 ± 3.9 , respectively for controls and obese subjects; $p < 0.01$) and oxidative stress levels (GSSG/GSH ratio 0.025 ± 0.005 vs 0.068 ± 0.019 , respectively for controls and obese subjects; $p < 0.0001$). Triglycerides rose after the administration of the unsaturated fat, reaching the maximum at 4 hours. However, HOMA and GSSG/GSH ratio showed significant decrease. We also found that after an

oral unsaturated fat load test there was a very significant modification of mRNA expression of FKBP5, DHRS9 and DDIT4 genes.

Conclusion: we have found that unsaturated fat improves insulin resistance and oxidative stress status together with modification of the gene expression of systems related to oxidative stress and immunomodulation. Thus, the consumption of unsaturated fat could be beneficial even in subjects with obesity. 1. Conflict of interest: None disclosed. 2. Funding: Instituto de Salud Carlos III (ISCIII) FIS PI10/00511

Table 1. Ratio GSSG/GSH during oral fat load test in subjects with abdominal obesity and controls

Ratio GSSG/GSH	Control group	Abdominal obesity group	p
Basal	0,025 \pm 0,005	0,068 \pm 0,019	<0,01
OFLT 4h	0,013 \pm 0,003	0,027 \pm 0,006	<0,01
OFLT 8h	0,011 \pm 0,002	0,022 \pm 0,049	<0,01

What is Normal? – Compartmental Fat and Muscle Quantification in a Large Scale Population Study using Magnetic Resonance Imaging

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Background and Aims: The UK Biobank imaging study [1] will include 100,000 subjects who undergo radiological examinations, including MR-based body composition analysis, as well as clinical investigations. The aim of this study was to measure visceral adipose tissue (VAT), abdominal subcutaneous adipose tissue (ASAT) and thigh skeletal muscles volumes in 1,000 subjects from the normal British population, and to generate a database with measurements available for research. **Materials and**

Methods: The first 1,000 subjects in the UK Biobank imaging cohort were scanned using a Siemens Aera 1.5 T scanner (Siemens, Erlangen, Germany). Body composition analysis was performed using AMRA Profiler (AMRA AB, Linköping, Sweden, 2015). Volumes of VAT, ASAT and thigh muscle were calculated using the method described in [2–4]. Descriptive statistics were calculated and individual results are made available for research groups through the UK Biobank population study database.

Results: Figure 1 shows 10 of the 1,000 subjects in the total imaged cohort, demonstrating the wide range of phenotypes imaged. The mean VAT, ASAT and thigh muscle volumes were 3.71 ± 2.26 L, 6.74 ± 3.12 L, and 10.45 ± 2.54 L respectively.

Conclusions: In the UK Biobank database, body composition measurements and clinical data will become invaluable tools for research into obesity, sarcopenia and associated comorbidities. Acknowledgements This research has been conducted using the UK Biobank Resource.

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Conflict of interest and Funding Disclosure: JW, MB, TR, and ODL receive salary and are shareholders of Advanced MR Analytics AB (AMRA), Linköping, Sweden.

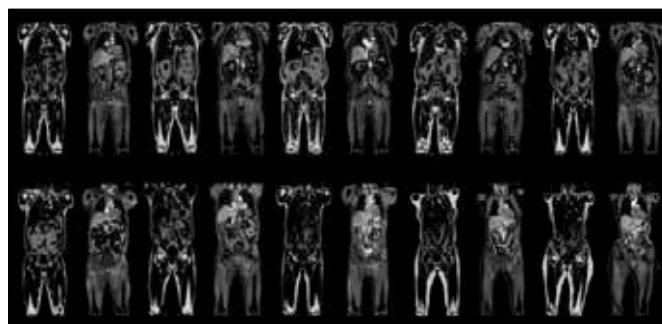


Fig. 1. Central coronal slices from 10 of the imaged subjects, demonstrating the wide range of phenotypes within the UK Biobank imaging study. For each subject; left shows intensity-corrected coronal fat image with fat segmentations using overlay colours, right shows intensity-corrected coronal water image with muscle segmentations using overlay colours.

PP2 – Health, Behaviour and Environment I

PP2.01

Childhood body size and the future risk of morphologically different variants of malignant melanoma

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Background: Malignant melanoma is subdivided into different variants with diverse etiological patterns. Adult body size, and a tall stature in particular is associated with melanomagenesis. It is largely unknown if the body size and melanoma association is restricted to adult ages or if childhood size also influences susceptibility to melanoma subtypes later in life. **OBJECTIVES:** To investigate if childhood body size at the ages 7 to 13 years is associated with the development of different melanoma subtypes in adulthood.

Material/Methods: The cohort derives from the Copenhagen School Health Records Register which contains height and weight measurements from children born 1930–1989. Height and body mass index (BMI: kg/m²) were transformed into z-scores. The Danish Cancer Registry was utilized to identify melanoma cases according to ICD-10 (C43) and they were subdivided into histological categories in agreement with ICD-O-3: superficial spreading melanoma (SSM) (8743), nodular melanoma (NM) (8721), acral lentiginous melanoma (ALM) (8744), lentigo maligna melanoma (LMM) (8742) and melanoma not otherwise specified (NOS) (8720). Cox proportional hazards regressions were conducted and analyses were stratified by sex and birth cohorts.

Results: Among 316,193 individuals, 2,190 (1,006 men and 1,184 women) cases of melanoma were identified and subdivided into SSM (60.9%), melanoma NOS (27.9%), NM (8.6%), LMM (2%) and ALM (0.6%). The ALM subtype was excluded from further investigations because of too few cases. At age 13 years, significant and positive associations per height z-score were identified with SSM (hazard ratio [HR]: 1.20, 95% confidence interval [CI]: 1.13–1.27), melanoma NOS (HR: 1.19, 95% CI: 1.09–1.29) and NM (HR: 1.21, 95% CI: 1.04–1.41), but not LMM (HR: 1.23, 95% CI: 0.91–1.66) in adulthood. Results were similar at ages 7–12 years. Generally, childhood BMI was not associated with future risk of the subtypes.

Conclusion: Childhood height, but not BMI, plays a significant role in the etiology of the majority of the melanoma variants. These findings suggest that the height-melanoma association already originates in childhood. The authors declare no conflicts of interest.

PP2.02

High childhood body mass index and gain in body mass index during childhood increases the risk of early adult ischemic stroke

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Background: Adult body mass index (BMI) is associated with ischemic stroke, especially at younger ages, but the association between childhood BMI and ischemic stroke in adulthood is unclear. We aimed to investigate if childhood BMI and gain in BMI during childhood are associated with the risk of early and late adult ischemic stroke.

Methods: We studied a cohort of 307,677 Danish school children born from 1930 to 1987 who had weight and height measurements at age 7, 10, or 13 years. BMI was calculated (kg/m²) and transformed to z-scores. We ascertained ischemic stroke events by linkage to national registers and categorized them as early (25 – 55 years) or late (>55 years) events. We used Cox proportional hazards regressions to estimate hazard ratios (HRs) with 95% confidence intervals (CIs) for the non-linear effects of childhood BMI, expressed as restricted cubic splines, and the linear effects of gain in BMI between age 7 and 13 years on early and late ischemic stroke.

Results: During 8,128,058 person-years of follow-up, 3,529 women and 5,370 men had an ischemic stroke. We found that both men and women with a childhood BMI z-score above average had an increased risk of early, but not late, ischemic stroke. The pattern of the associations with early ischemic stroke were similar at all ages in childhood, but strongest at age 13 years, where a BMI z-score of 1 was associated with a HR of 1.26 (95% CI: 1.11, 1.43) in women and 1.21 (95% CI: 1.10, 1.33) in men. A BMI z-score gain of 1 from age 7 to 13 years was associated with an increased risk of early ischemic stroke in both sexes (women: 1.26 HR, 95% CI 1.13, 1.42; men: 1.20 HR, 95% CI 1.09, 1.32) and late ischemic stroke only in women (1.10 HR, 95% CI 1.03, 1.17).

Conclusion: In this large prospective study we found that having a BMI above average in childhood as well as a BMI gain during childhood increases the risk of early adult ischemic stroke. Future research should address the potential influence of other risk factors such as diabetes and hypertension.

PP2.04

Evidence for intrauterine factors explaining the association between birth weight and later body mass index using a natural experiment of twinning: A study on 27 twin cohorts participating in the CODATwins project

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Introduction: Birth weight has been found to be positively associated with body mass index (BMI) in later life, but it remains unclear whether this is mediated by genetic, shared environmental or individual-specific factors. We analyzed the association between birth weight and BMI from infancy to adulthood in monozygotic (MZ) and dizygotic (DZ) twins, which allowed us to control for maternal and genetic influences.

Methods: This study is based on the data from 27 twin cohorts in 17 countries participating in the Collaborative project of Development of Anthropometrical measures in Twins (CODATwins), and included 78,592 individual twins (39,296 twin pairs) with information on birth weight and a total of 213,466 BMI measurements at ages ranging from 1 to 49 years. The association between birth weight and BMI was analysed at both the individual and within-pair level using linear regression analyses.

Results: Birth weight was positively associated with BMI at both the individual and within-pair level; associations were significant at most ages and their pattern was roughly similar in males and females. When twins were treated as individuals, a 1-kg increase in birth weight was associated with up to 0.9 kg/m² higher BMI. Within twin pairs, regression coefficients were generally greater (up to 1.3 kg/m²) than at the individual level, especially in childhood. This indicates that factors specific to each individual must be involved in the underlying causal pathways. Associations between birth weight and BMI were similar in MZ and DZ twins suggesting that genetic factors are not importantly involved. The magnitude of the associations was somewhat weaker in late adolescence and adulthood than in childhood.

Conclusion: Our findings suggest that the positive association between birth weight and later BMI is mainly mediated by individual specific factors in utero. Acknowledgement: This study was conducted within the CODATwins project (Academy of Finland #266592).

PP2.05

Dietary patterns are associated with changes of visceral fat accumulation in adults: Tehran Lipid and Glucose Study

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Background and Objectives: Lipid accumulation product (LAP) is a novel biomarker of central lipid accumulation related to risk of diabetes and cardiovascular disease. The aim of this study was to investigate the relationship between major dietary patterns, lipid accumulation product (LAP) index and serum insulin in adults.

Methods: and Study design: In this longitudinal study, 904 adult men and women were studied within the framework of Tehran Lipid and Glucose Study. The usual dietary intakes were assessed at baseline using a validated 168 item semi-quantitative food frequency questionnaire and major dietary patterns were obtained using principal component analysis. Anthropometric and biochemical measurements were assessed at baseline (2006–2008) and again after 3 years (2009–2011). Linear regression models with adjustment for potential confounding variables were used to evaluate the association of dietary patterns score with 3-year changes of LAP and insulin levels.

Results: Mean age of participants was 38.8 ± 11.2 years and 45.5% were men. Mean LAP was 47.6 ± 38.8 at baseline. Three major dietary patterns including the Western, traditional and healthy were extracted, which explained 25.3% of total variance in food intake. Higher score of healthy dietary pattern, characterized by higher intake of vegetable oils, fresh and dried fruits, low-fat dairy, nuts and seeds, was accompanied with lower LAP ($\beta = -0.21$, 95% CI = $-0.26, -0.15$) and serum insulin concentrations ($\beta = -0.30$, 95% CI = $-0.36, -0.24$), at following examination. Western dietary pattern with higher load of fast foods, salty snacks, mayonnaises, soft drinks, and confectioneries was positively associated with 3-year changes of LAP ($\beta = 1.47$, 95% CI = $1.34, 2.28$) and insulin levels ($\beta = 0.21$, 95% CI = $0.08, 0.49$).

Conclusion: Findings confirmed the protective effect of a plant-based, low-fat dietary pattern against visceral fat accumulation and hyperinsulinemia as the main risk factors for development of diabetes and cardiovascular disease. Moreover, Western dietary pattern could accelerate development of central lipid accumulation and insulin dysfunction.

PP2.06

Enhancing or diminishing autonomy for obesity prevention: An analysis of the 'intrusiveness' of policy recommendations to the Australian government

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Government led obesity policy in Australia is inadequate. Tools are required to inform ethical decisions where empirical data on effectiveness is lacking. This study aimed to explore policy options for obesity prevention, through their intrusiveness and influence on autonomy, as potential constructs for predicting success. A content analysis of submissions to the Australian Government's Inquiry into Obesity (2009) was conducted. Using two ethical frameworks, 1111 policy recommendations were extracted and categorised as enhancing or reducing autonomy, and through seven incremental levels of intrusiveness. The most widely recommended options were those enhancing autonomy (46%), in particular those enabling choice (33%). Highly intrusive restrictions on choice, which reduced autonomy, were the most prevalent for schools (27%), but were less often supported for workplace or community settings (0.2%). Providing incentives was more commonly recommended than disincentives or restrictions; examples which reduce autonomy to a greater extent. This analysis supports the relevance of these constructs to obesity prevention policy options. The acceptable level of intrusiveness may vary according to the setting and target behaviour. Policies which enable individual choice may be most widely supported, attributable perhaps to their capacity to enhance autonomy, and therefore could be prioritised by policy makers.

PP2.07

Intentional weight loss attempts among adults in England: Prevalence and trends over time, 1997–2013

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Background: Public policy is to encourage people with excess weight to try to lose weight¹, but has prompted concerns that it might inadvertently condone dieting attempts among those within or below the healthy body weight range.

Objectives: To examine trends over time in the prevalence of dieting in England (1997–2013) and to investigate if the characteristics associated with dieting changed over this period.

Methods: We included adults ≥18y who participated in the Health Survey for England (HSE) in 1997, 1998, 2002, 2012 and 2013, with nationally representative data on attempts to lose weight, age, gender, ethnicity, social class and education as well as measured height, weight, blood pressure and cardiovascular disease (CVD) events or medications. We used multivariable logistic regression analyses to assess the cross-sectional association between dieting and exposures such as survey year, socio-demographic variables and health status.

Results: The age-standardised prevalence of dieting in the English population increased from 39% in 1997 to 47% in 2013. In 2013, there were 10% of dieters with BMI <22; 30% with BMI ≥22 to <25; 53% with BMI ≥25 to <30; and 76% with BMI ≥30, although these figures were higher among females. The odds of dieting increased linearly with each year, OR 1.021 (95%CI 1.018–1.024). The OR after adjustment for increased BMI over time and other covariates was 1.024 (95%CI 1.008–1.039). The biggest predictors of dieting were being in the overweight and obese categories: 5.42 (95%CI 5.05–5.81) and 12.68 (95%CI 11.52–13.96) respectively; and female gender: 3.01 (95%CI 2.85–3.18). Being overweight and having CVD was associated with a modest increase in the odds of dieting. There was no evidence that the predictors of dieting changed over time.

Conclusions: The prevalence of intentional weight loss in England has increased since the 1990s, which cannot be completely explained by the increased prevalence of overweight and obesity. The prevalence of dieting

at a lower BMI than optimum for health has increased at a similar rate as in people in overweight categories.

Reference:

1 National Institute of Health and Clinical Excellence (NICE). The prevention, identification, assessment and management of overweight and obesity in adults and children. London 2006.

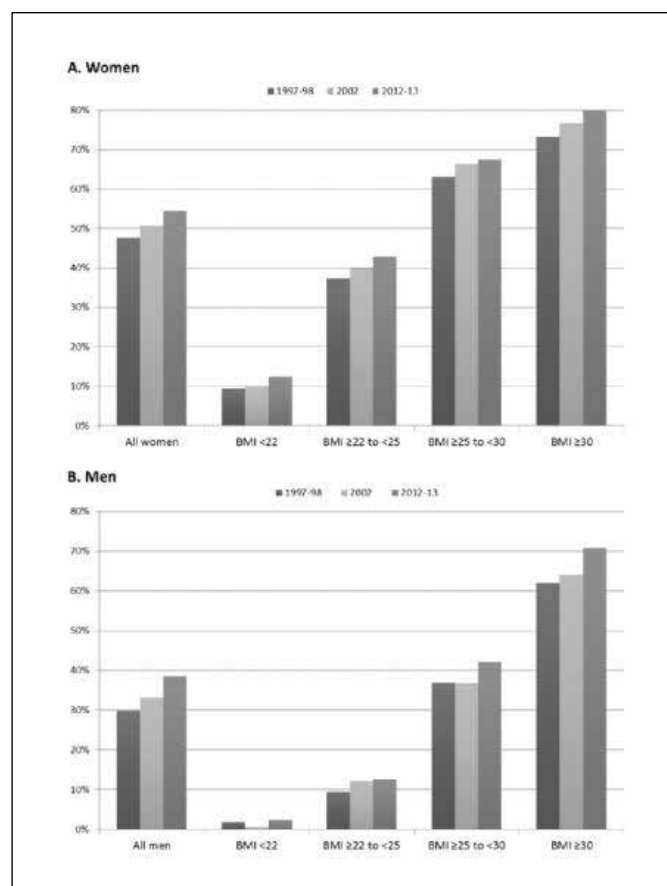


Fig. 1. Trends in age-standardized prevalence of dieting by BMI and sex among adults included in the HSE from 1997 to 2013.

PP2.08

An analysis of behaviour change techniques used in a sample of gestational weight management trials

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Introduction: Maternal obesity and excessive gestational weight gain (GWG) are associated with multiple adverse outcomes such as macrosomia, shoulder dystocia and gestational diabetes leading to a significant demand on health services' staff and resources. Despite a global rise in maternal obesity and excessive GWG, there is a lack of clarity about effective interventions and their specific components to guide professionals and women on GWG management. **METHOD:** All 44 studies of lifestyle interventions with a potential to impact on maternal weight outcomes that have previously been appraised and meta-analysed in a well-documented Health Technology Assessment commissioned review (Thangaratinum et al 2012) were considered for content analysis within this analytical review. Interventions were classified using Behaviour Change Technique (BCT) Taxonomy clusters (Michie et al 2013) to explore which categories of BCT were used and their effectiveness in managing GWG.

Results: It was not possible to apply any BCT taxonomy code to 10 studies. Within the remaining 34 studies the most commonly used BCT categories included 'feedback and monitoring', 'shaping knowledge', 'goals and planning', 'repetition and substitution', 'antecedents' and 'comparison of behaviours'. For diet and mixed interventions 'feedback and monitoring', 'shaping knowledge' and 'goals and planning' were the most frequent BCT categories in successful studies. Only 1 physical activity intervention that successfully reduced GWG had a clear BCT category, limiting the prediction of successful BCT pattern (Figure 1).

Conclusions: Poor reporting within current interventional studies in defining the BCTs used, in clarifying the differences in processes between intervention and control groups, and in differentiating between the intervention and research processes, made BCT classification difficult. Future studies should be more explicit on the behaviour change techniques used and report them clearly and accurately to allow a robust evaluation of the ingredients of lifestyle interventions for effective gestational weight management.

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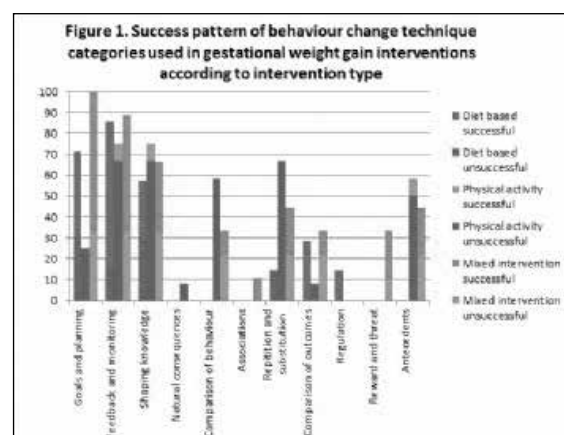


Fig. 1. Success pattern of behaviour change technique categories used in gestational weight gain interventions according to intervention type

PP2.09

Burden of Cancer attributable to high Body Mass Index (BMI) in the Republic of Ireland for 1990 and 2013

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Background: Prevalence of high-BMI is continuing to rise in most developed countries including Ireland. The National Adults Nutrition Survey, Ireland in 2011 showed that 26% of males and 21% of females were obese. High BMI is commonly associated with cancers such as ovary, kidney and colon but the magnitude of obesity-related mortality and morbidity needs quantification.

Objectives: Quantify the number of deaths, Disability Adjusted Life Years (DALYs) and Years of Life Lived with Disability (YLLs) from the various cancers attributable to high-BMI ($\geq 25 \text{ kg/m}^2$) for Ireland for 1990 and 2013.

Methodology: Openly accessible data on all cancers and high-BMI for Ireland was taken from the Institute of Health Metrics and Evaluation (United States) website¹. Burden metrics computed were Years of Life

lived with Disability YLDs: product of prevalence and disability weight (YLD); Years of Life Lost to premature mortality (YLLs): product of total deaths at each age and the reference life expectancy at that age; and DALYs=YLDs+YLLs. The estimates are based on total disease conditions and risk factors and are analysed using the Global Burden of Disease study protocols. The absolute number of deaths, DALYs and YLDs from the different cancers attributable to high-BMI are reported for both years. Health Adjusted Life expectancies (HALE) were also reported for both years.

Results: Cancer Deaths, YLDs and DALYs attributable to high-BMI were highest in colorectal cancer for both years. Cancer burden attributable to high-BMI showed an increasing trend in terms of the deaths and DALYs from 1990 to 2013 for all cancers except gallbladder cancer. All cancers showed increased YLDs (overall total YLDs attributable to high-BMI doubled from 263 in 1990 to 528 in 2013). Cancers including colorectal, breast, gallbladder, kidney and leukaemia had double YLDs attributable to high-BMI in 2013 compared to 1990. Males had higher DALYs attributable to high-BMI than females. Overall HALE increased from 75 years in 1990 to 80 years in 2013 (females had a higher HALE compared to males for both the calendar periods).

Conclusion: Overall life expectancy in Ireland has improved but the years lived with disability from cancer attributable to high-BMI has increased considerably and thus the quality of life has declined across the 23 year period.

Acknowledgement: My co-authors

Total Burden metrics: Absolute number of Deaths, DALYs and YLDs from cancer attributable to high-BMI for Ireland in 1990 and 2013.

Reference:

www.healthdata.org

Type of Cancer	Absolute number of deaths attributable to High BMI		Absolute number of DALYs attributable to High-BMI		Absolute number of YLDs attributable to High-BMI	
	1990	2013	1990	2013	1990	2013
Liver cancer	6	18	109	317	1	4
Colorectal cancer	109	144	2124	2745	79	151
Breast cancer	45	58	973	1270	57	128
Kidney cancer	28	51	612	1074	23	61
Ovary cancer	8	12	177	260	5	11
Oesophageal cancer	76	113	1460	2156	19	31
Leukaemia	19	25	375	509	14	29
Pancreatic cancer	28	44	517	788	5	9
Gallbladder cancer	21	6	352	303	6	13
Uterine cancer	27	38	557	757	54	91
Totals	367	509	7256	10179	263	528

** All values are rounded off to the nearest integer value.

Table 1. This table shows the total number of deaths, DALYs and YLDs from cancer attributable to the risk factor-high BMI for Ireland in 1990 and 2013.

PP2.10

Secular changes in well-being of young Swedes in relation to weight status: The 'Grow up Gothenburg' Studies

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Aim: The aim was to describe secular differences in various dimensions of well-being in relation to weight status in two school-based cohorts of Swedish adolescents.

Material/Methods: Two different cohorts of 18-year-olds, born 1974 and 1990, completed a self-reported questionnaire including the Gothenburg well-being scale for adolescents (GWBa). In addition, height and weight were measured by trained study teams, resulting in 4362 (1974 birth cohort) and 5151 (1990 birth cohort) participants with age, height, weight and well-being data. The GWBa consists of five dimensions and a total score; Mood, Self-esteem, Physical condition, Energy, and Stress balance.

Results: Comparing the birth cohorts, total well-being score was lower in the later-born cohort ($p < 0.001$). The greatest difference was seen for the dimension Stress balance (feeling calm, unconcerned, relaxed and not stressed). In both cohorts boys reported significantly higher well-being compared to girls for all dimensions. In the sex-stratified analysis, well-being was significantly lower in both boys and girls for all dimensions in the later-born cohort, with the exception of the dimension Self-esteem in girls, which was significantly higher in the later-born cohort. The BMI z-score, according to the WHO BMI-for-age reference, was significantly higher in boys from the later-born cohort, still, even after adjusting for weight status and age, the significant differences between the cohorts remained for almost all dimensions. When comparing well-being according to weight status, thin boys had lower scores compared to normal weight boys, while overweight and obese boys had higher scores than normal weight boys in almost all dimensions. In contrast, normal weight girls had higher well-being scores than girls in all other weight status groups.

Conclusion: Well-being was lower in the later-born cohort, which was not explained by secular differences in BMI. In both cohorts, girls felt more stressed than boys and consistently reported lower levels of well-being than boys for all dimensions. The high levels of stress, particularly among girls, might be an area of intervention for improved well-being in adolescents.

PP2.11

A large hip is protective against hip fracture

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Background & Aim: Two previous studies found hip circumference to inversely associate with hip fracture in women (1,2), but the association was not independent of BMI. The aim of the present study was to examine if hip circumference could predict hip fracture in a Swedish female cohort, and to elucidate how adjustment for different measures of body size affects the association.

Material & Methods: We used data from the Prospective Population Study of Women in Gothenburg, which started in 1968 with representative samples of women born in 1908, 1914, 1918, 1922 and 1930. New birth cohorts were invited in 1980 (born 1942 and 1954) and in 2004 (born 1966). A total of 1793 women were included in the analyses. Weight, height and hip circumference were measured and physical activity and smoking were self-reported. Hip fractures until 2015–05–01 were identified from national hospital registries. We used Cox proportional hazards regression to examine the association between hip circumference and hip fracture. Person-time of follow-up since examination of hip circumference was used as underlying time metric. Hip circumference was parameterized as quintiles (Q) with the lowest Q (Q1) as reference (Q1≤93 cm).

Results: Median age at examination was 46.6 years and median follow up was 31.9 years. During follow-up 267 hip fractures occurred. In analyses adjusted for age, weight, physical activity and smoking, a hip circumference ≥ 97 cm (≥Q3) was significantly associated with reduced risk of hip fracture (HR (95% CI) Q3:0.60(0.40–0.90), Q4:0.50(0.31–0.82), Q5:0.44(0.24–0.84)). Adding 1/height² to the model only marginally affected these estimates. Exchanging weight and 1/height² by BMI attenuated the estimates to statistical non-significance (Q3:0.74(0.41–1.32), Q4:0.68(0.42–1.10), Q5:0.72(0.49–1.08)).

Conclusion: In conclusion, weight and height per se do not seem to explain the protection against hip fracture from having a large hip. However, the attenuating effect of BMI, a proxy of fatness, might suggest that the protective effect of a large hip lies in the padding effect of fat mass in the region.

References:

1 Parker et al. AEP. 2008;836–841.

2 Sogaard et al. J Intern Med. 2015;306–317.

PP3 – Clinical Management I

PP3.01

Comparison of anthropometric parameters in the evaluation of risk of cardiometabolic comorbidities in patients with morbid obesity

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Background/Aims: The anthropometric assessment is important in the evaluation of the cardiometabolic risk of overweight and obese patients. However, it is controversial which parameters are more relevant in this evaluation, particularly regarding patients with morbid obesity. Therefore, our aim was to evaluate the predictive capacity of anthropometric parameters in identifying morbid obese patients with cardiometabolic comorbidities.

Methods: We evaluated 1180 patients with morbid obesity (1014 women) followed on multidisciplinary consult of obesity, by calculating the anthropometric parameters BMI, waist perimeter (WP), hip perimeter (HP), waist-to-hip ratio (WHR), waist-to-height ratio (WHtR) and waist-

to-hip-to-height ratio (WHHtR). We used the area under ROC curve (AUC-ROC) to evaluate the capacity to predict the presence of metabolic syndrome (SM), diabetes, dyslipidaemia, hyperuricemia and hypertension in women and men. A $p < 0.05$ was considered statistically significant.

Results: In women, WHR, WHtR and WHHtR were predictors of MS, diabetes, dyslipidaemia, hyperuricemia and hypertension. The WP and BMI were not predictors of dyslipidaemia, being predictors of the other comorbidities. The parameter with the highest predictive capacity for most cardiometabolic comorbidities was WHHtR (AUC-ROC: SM 0.645, diabetes 0.640, dyslipidaemia 0.643, and hypertension 0.569), with the exception of the prediction of hyperuricemia in which WHtR (AUC-ROC 0.632) was better. In men, WHHtR was the only positive predictor of dyslipidaemia (AUC-ROC 0.661) and WP was the only positive predictor of hyperuricemia (AUC-ROC 0.628). Paradoxically, BMI and WP were negative predictors of dyslipidemia (AUC-ROC 0.380 and 0.357, respectively) and BMI, WP and WHtR were negative predictors of diabetes (AUC-ROC 0.355, 0.333 and 0.369, respectively). It is noteworthy to highlight that HP was also a negative predictor of diabetes (AUC-ROC 0.300) and dyslipidaemia (AUC-ROC 0.283).

Conclusion: In women with morbid obesity, WHHtR is the anthropometric parameter that better predicts the existence of cardiometabolic comorbidities. In men, the anthropometric parameters have low predictive capacity and, those that do not include HP, may present a paradoxically negative association with cardiometabolic comorbidities.

PP3.02

Hepatic left lobe volume as an indicator of adiposity and related metabolic abnormalities in patients with NAFLD

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Background: Non-alcoholic fatty liver disease (NAFLD) is strongly associated with metabolic syndrome and increased cardiovascular risk. We aimed to evaluate the relationship between liver enlargement and components of metabolic syndrome in patients with NAFLD.

Objectives: To study the correlation of hepatic left lobe volume (HLLV) with indicators of adiposity, fasting blood glucose (FBG), insulin sensitivity, subclinical inflammation and metabolic syndrome.

Methods: This cross-sectional study included 75 subjects (51 females), 20–60 years with NAFLD. Measurements included blood pressure, anthropometry and biochemical measures (fasting blood glucose, lipid profile, hs-CRP and fasting insulin). HLLV was measured by using ultrasonography as well as computerized tomography (CT) scan. Quantification of abdominal fat compartments and hepatic fat was done by CT scan.

Results: Almost 96% of subjects were either overweight or obese and metabolic syndrome was present in 54.7%. Most of the subjects had grade 1 NAFLD (58.7%) and only 12% had grade 3 NAFLD. The HLLV was significantly higher in those with metabolic syndrome than those without (141.3 vs 92.7 ml, $p = 0.001$). HLLV correlated positively with measures of generalised and truncal adiposity, total abdominal fat, systolic and diastolic blood pressure, uric acid, serum triglycerides, blood glucose, fasting insulin and hs-CRP, while a negative correlation was seen with HDL-c. In multiple linear regression analysis, HLLV was independently associated with systolic blood pressure, fasting glucose, fasting insulin, hs-CRP and uric acid. Using ROC analysis, a cutoff value of 96.4 ml of HLLV was observed to be appropriate for the presence of metabolic syndrome, insulin resistance and elevated hs-CRP levels.

Conclusion: Ultrasonographically measured HLLV can be used as a simple and cost effective tool not only for detecting the presence of cardiovascular risk factors, but also may also be useful in monitoring the effectiveness of treatment strategies in patients with NAFLD.

Body Mass Index Standard Deviation Score (BMI SDS) in children with severe obesity: Need for alternatives

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Background: Body Mass Index Standard Deviation Scores (BMI SDS) are widely used for monitoring weight progress in children. Several authors have shown that the BMI reference curves are highly skewed, and that the BMI SDS may not be the best metric to monitor weight in children with obesity.

Objectives: We aimed, first, to compare the distribution of BMI SDS according to international (IOTF, WHO) and local reference curves in children with severe obesity that belong to different age groups, second, to compare the BMI SDS in these children with age standardized percentage body fat (%BF) as measured with bioelectrical impedance analysis (BIA), and, third, to explore alternatives for the BMI SDS to assess the degree of obesity.

Method: Baseline BMI of 405 consecutive children and adolescents, aged 4–18 years, entering a treatment program in a tertiary care obesity centre in Norway, were converted to BMI SDS using the IOTF, WHO and the local BMI references. The associations between %BF and BMI SDS were examined using linear regression analysis. The agreements between these methods and %BF SDS were explored with Bland-Altman plots

Results: The mean(SD) BMI SDS were 3.28(0.47), 4.02(1.12) and 3.34(0.64) using the IOTF, WHO and the local references, respectively ($p < 0.001$). In addition, the BMI SDS was highly variable across age groups, with the highest values in the youngest children (about 4 years of age), and the lowest in children around 10 years of age. The BMI SDS explained 26%, 14% and 54% of the variance (R^2) in %BF SDS when using the IOTF, WHO and local references, respectively. The BMI was more consistent across age groups when expressed as a percentage relative to a given cut-off (the IOTF overweight or obesity lines, for instance).

Conclusion: The distribution of BMI SDS was in our sample of children with severe obesity strongly dependent on age. We argue that the BMI SDS should be used cautiously when monitoring children with severe obesity, particularly below 10 years of age. Our results indicate that the percentage above a particular BMI cut-offs may be a more appropriate alternative when monitoring children with severe obesity.

Obese men with type 2 diabetes (T2DM) and testosterone deficiency achieve progressive weight loss and improved glycaemic control during 8 years treatment with injectable testosterone undecanoate (TU) compared to untreated controls

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Background: Hypogonadal men with T2DM respond favourably to testosterone therapy (TTh). The longest follow-up published to date was 6 years. We analysed 8-year data.

Methods: In a controlled registry study of 656 hypogonadal men in a urologist's office, 230 (35.1%) had T2DM. Mean age: 63.4 ± 4.7 years, BMI: 33.5 ± 4.6 kg/m². 113 men received TTh (T group) with TU 1000 mg/12 weeks for up to 8 years. 117 men had opted against TTh and served as controls (CTRL). Mean changes over time between the two groups were compared by a mixed effects model for repeated measures with a random effect for intercept and fixed effects for time, group and their interaction. Changes were adjusted for age, weight, waist circumference (WC), fasting

glucose, blood pressure, and lipids to account for baseline differences between groups.

Results: Weight (kg) decreased from 112.5 ± 13.2 to 91.8 ± 9 in the T group ($p < 0.0001$) and remained stable at 96.9 ± 10.2 in CTRL. The model-adjusted estimated between-group difference at 8 years was -21.9 ($p < 0.0001$). WC (cm) decreased from 110.7 ± 7.3 to 100.5 ± 5.4 in the T group and increased from 110.2 ± 7.2 to 110.7 ± 6.1 in CTRL, between-group difference: -13 ($p < 0.0001$ for all). BMI (kg/m²) decreased from 36.1 ± 4.2 to 29.7 ± 2.8 in the T group ($p < 0.0001$) and from 31 ± 3.5 to 30.9 ± 2.9 in CTRL (NS), between-group difference: -6.8 ($p < 0.0001$). Mean weight change was -19 ± 5.6% in the T group ($p < 0.0001$) and +1.1 ± 2.9% in CTRL ($p < 0.01$), between-group difference: -21.2% ($p < 0.0001$). Fasting glucose (mmol/L) decreased from 6.24 ± 0.79 to 5.23 ± 0.05 in the T group ($p < 0.0001$) and remained stable at 5.83 ± 0.3 in CTRL (NS), between-group difference: -0.87 ($p < 0.0001$). HbA1c decreased from 8.03 ± 0.83 to 5.77 ± 0.43% in the T group and increased from 7.44 ± 0.66 to 8.01 ± 0.78% in CTRL, between-group difference: -2.52% ($p < 0.0001$ for all). The triglyceride:HDL ratio, a surrogate parameter for insulin resistance, decreased from 5.38 ± 2.41 to 2.27 ± 0.51 in the T group ($p < 0.0001$) and from 7.99 ± 4.35 to 7.02 ± 4.25 in CTRL ($p < 0.05$), between-group difference: -3.75 ($p < 0.0001$). No patient dropped out, medication adherence for TU was 100% as injections were office-administered.

Conclusions: Long-term TTh with TU in obese diabetic hypogonadal men resulted in weight loss and improvements in glycaemic control. Untreated controls showed no improvements.

Table 1. to PP3.04 Progressive improvements of anthropometric and glycaemic parameters in obese hypogonadal men with type 2 diabetes mellitus under testosterone therapy compared to untreated controls

T group=testosterone group; CTRL=control; BMI=body mass index; TyG index= triglycerides × glucose index

	baseline ± SD	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8
weight (kg)									
T group	112.5 ± 13.2	108.8 ± 12.5	103.7 ± 11.8	100.4 ± 10.9	98.6 ± 9.8	97.3 ± 9.4	94.9 ± 8.8	93.3 ± 8.9	91.8 ± 9
CTRL	96.9 ± 10.2	97.3 ± 10.4	97.5 ± 10.5	97.7 ± 10.6	97.7 ± 10.3	97.8 ± 10.3	97.9 ± 10	97.7 ± 9.4	96.9 ± 9
waist circumference (cm)									
T group	110.7 ± 7.3	108.6 ± 6.9	105.6 ± 6.4	103.8 ± 6.3	103.2 ± 5.9	103 ± 5.6	102.5 ± 5.5	101.6 ± 5.4	100.5 ± 5.48
CTRL	110.2 ± 7.2	110.5 ± 7.4	110.8 ± 7.5	111 ± 7.7	111.1 ± 7.5	111.2 ± 7.5	111.3 ± 7.5	111.7 ± 6.7	110.7 ± 6.1
BMI (kg/m ²)									
T group	36.1 ± 4.2	34.9 ± 4	33.3 ± 3.8	33.2 ± 3.5	31.7 ± 3.2	31.3 ± 3	30.6 ± 2.8	30.1 ± 2.8	29.7 ± 2.8
CTRL	31 ± 3.5	31.1 ± 3.6	31.2 ± 3.6	31.2 ± 3.6	31.2 ± 3.6	31.3 ± 3.5	31.3 ± 3.5	31.2 ± 3.3	30.9 ± 2.9
weight change (%)									
T group	0 ± 0	-3.3 ± 1.7	-7.8 ± 2.9	-10.6 ± 3.7	-13.1 ± 4.2	-15.5 ± 4.5	-17 ± 4.9	-18.2 ± 5.3	-19 ± 5.6
CTRL	0 ± 0	0.4 ± 0.9	0.7 ± 1.2	0.9 ± 1.4	1.3 ± 1.4	1.6 ± 1.7	1.6 ± 1.8	1.5 ± 2	1.1 ± 2.9
waist:height ratio									
T group	0.63 ± 0.04	0.61 ± 0.04	0.6 ± 0.04	0.59 ± 0.04	0.58 ± 0.03	0.58 ± 0.03	0.58 ± 0.03	0.58 ± 0.03	0.57 ± 0.03
CTRL	0.62 ± 0.04	0.62 ± 0.04	0.63 ± 0.05	0.63 ± 0.05	0.63 ± 0.05	0.63 ± 0.05	0.63 ± 0.05	0.63 ± 0.04	0.63 ± 0.04
fasting glucose (mmol/L)									
T group	6.24 ± 0.79	5.79 ± 0.65	5.5 ± 0.44	5.36 ± 0.29	5.33 ± 0.18	5.3 ± 0.11	5.31 ± 0.1	5.28 ± 0.07	5.23 ± 0.05
CTRL	5.83 ± 0.31	5.85 ± 0.27	5.86 ± 0.27	5.86 ± 0.32	5.82 ± 0.3	5.82 ± 0.25	5.83 ± 0.28	5.78 ± 0.27	5.83 ± 0.34
HbA1c (%)									
T group	8.03 ± 0.83	7.53 ± 0.71	7.04 ± 0.64	6.77 ± 0.57	6.51 ± 0.52	6.38 ± 0.48	6.18 ± 0.51	5.97 ± 0.46	5.77 ± 0.43
CTRL	7.44 ± 0.66	7.53 ± 0.69	7.58 ± 0.66	7.71 ± 0.65	7.77 ± 0.59	7.84 ± 0.61	7.9 ± 0.63	7.95 ± 0.63	8.01 ± 0.78
triglyceride:HDL ratio									
T group	5.38 ± 2.41	4.37 ± 1.84	3.4 ± 1.11	2.97 ± 0.76	2.73 ± 0.65	2.68 ± 0.69	2.65 ± 0.68	2.5 ± 0.6	2.27 ± 0.51
CTRL	7.99 ± 4.35	7.89 ± 4.13	7.75 ± 4.17	7.68 ± 4	7.55 ± 3.82	7.69 ± 4.11	7.64 ± 4.05	7.79 ± 4.39	7.02 ± 4.25
TyG index									
T group	4.22 ± 0.1	4.12 ± 0.08	4.03 ± 0.07	4 ± 0.05	3.98 ± 0.04	3.97 ± 0.03	3.97 ± 0.02	3.96 ± 0.02	3.95 ± 0.02
CTRL	4.16 ± 0.08	4.18 ± 0.07	4.18 ± 0.08	4.19 ± 0.08	4.18 ± 0.08	4.18 ± 0.08	4.18 ± 0.09	4.18 ± 0.08	4.19 ± 0.08

Increased basal lipolysis between two and five years after gastric bypass surgery associates with decreased insulin sensitivity

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Introduction: Bariatric surgery leads to diabetes remission in many subjects with type 2 diabetes and also reduces the risk of developing type 2 diabetes. However, after initial weight loss, body mass index (BMI) starts to increase and after a couple of years diabetes relapse has been reported in up to more than one third of those with initial remission. Since adipocyte lipolysis may be involved in regulation of insulin sensitivity we investigated changes in lipolysis in relation to changes in insulin sensitivity after gastric bypass surgery.

Methods: Forty-one women were examined before, two and five years after gastric bypass surgery. Abdominal subcutaneous adipose tissue was collected and basal and noradrenaline stimulated lipolysis were measured. Insulin sensitivity was measured by Homeostatic model assessment of insulin resistance (HOMA-IR).

Results: Body mass index, HOMA-IR, basal lipolysis and noradrenaline stimulated lipolysis decreased during the first 2 years after gastric bypass operation and all these parameters except noradrenaline stimulated lipolysis increased between two and five years post-operatively (Figure 1). Although changes in both BMI and basal lipolysis correlated with HOMA-IR when tested with simple regression, changes in basal lipolysis, but not changes in BMI, correlated with decreased insulin sensitivity measured by HOMA-IR in multiple regression analysis ($p = 0.007$ $r = 0.47$ and $p = 0.90$ $r = 0.02$ respectively).

Conclusion: Basal lipolysis increased between two and five years after gastric bypass surgery and associated with increased insulin resistance measured by HOMA-IR independently of changes in BMI. Increased basal lipolysis may contribute to relapsing insulin resistance after initial improvement following gastric bypass surgery.

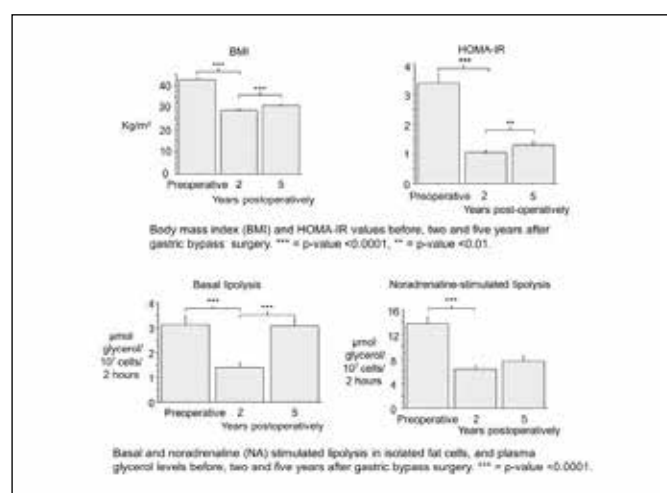


Fig. 1.

Modifications of Resting Energy Expenditure after surgical or medical weight loss: Is there any difference?

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Background/Aim: Resting energy expenditure (REE) tends to decline after caloric restriction more than what is expected according to body composition changes. This metabolic adaptation is considered one of the factors favoring weight regain and obesity recidivism. Weight maintenance is more common after bariatric surgery than after medical weight loss. Our **Aim:** was to evaluate if metabolic adaptation is different after surgical or medical weight loss.

Methods: REE (indirect calorimetry) and body composition (fat-free mass or FFM, fat mass or FM by bioelectrical impedance analysis) were determined before and after a 12 months weight loss in 98 obese patients (mean BMI: 46.8 ± 8.0 kg/m²) treated with laparoscopic sleeve gastrectomy (LSG) and in 21 obese patients (mean BMI: 35.1 ± 15.0 kg/m²) reaching at least a 10% weight loss with a lifestyle modification program.

Results: Weight loss was $28.3 \pm 9.2\%$ of the baseline body weight in the surgical group and $18.5 \pm 6.2\%$ in the medical group ($p < 0.001$), with corresponding relative reductions in FM (44.4 ± 18.0 vs $34.7 \pm 13.0\%$, $p < 0.05$), FFM (13.1 ± 8.0 vs $6.1 \pm 7.3\%$, $p < 0.01$), and REE (28.3 ± 12.6 vs $15.0 \pm 17.0\%$, $p < 0.01$). In order to account for body composition changes, a predictive equation for REE was derived by using the baseline FFM and FM values. A predicted post-weight loss REE was then calculated by using this equation and by entering the individual body composition values measured after weight loss. Metabolic adaptation was defined as the difference between observed and predicted REE after weight loss. Metabolic adaptation was -182 ± 227 kcal/day in the surgical group and -86 ± 212 kcal/day in the medical group ($p =$ not significant).

Conclusion: Metabolic adaptation during weight loss, defined as any reduction of REE beyond what is can be expected by FFM and FM loss, was not significantly different in patients losing weight after LSG and in patients losing weight by lifestyle modifications. Weight maintenance after bariatric surgery seems not to be attributable to differences in REE adaptation during weight loss.

Long-term effects of bariatric surgery on gall bladder disease in the Swedish obese subjects study

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Background: Obesity and rapid weight loss are both risk factors for gall stone formation. An increase in self-reported gall bladder disease two years after bariatric surgery has previously been reported from a SOS study sub-cohort. The current report is an update of these Results with longer follow-up using registry-based data.

Aim: To investigate the long-term incidence of in-hospital treated gall bladder disease and its complications after bariatric surgery.

Method: The SOS study is an ongoing, prospective, controlled trial comparing the effects of bariatric surgery with usual care. It includes 2010 surgically treated obese individuals and 2037 matched controls recruited between 1987 and 2001. The surgical techniques used were gastric bypass (GBP, $n = 265$), vertical banded gastroplasty (VBG, $n = 1369$) and gastric banding (banding, $n = 366$). Data on gall bladder disease were obtained from questionnaires and the Swedish national patient registry. Mean follow-up time was 17.7 years. The analysis was made per protocol and patients with previous cholecystectomy were excluded.

Results: In patients with no history of gall bladder disease at baseline ($N = 2748$) there was a higher incidence of gall stone disease after GBP (HR 1.83, 95% CI 1.28–2.60) and VBG (HR 1.57, 95% CI 1.26–1.96), a

higher incidence of cholecystitis after GBP (HR 1.75, 95% CI 1.03–2.96) and VBG (HR 1.75, 95% CI 1.27–2.41), and a higher incidence of cholecystectomy after GBP (HR 2.04, 95% CI 1.37–3.03) and VBG (HR 1.82, 95% CI 1.41–2.35), as compared to the control group. No difference was found when comparing banding with the control group. In patients with gall bladder disease at baseline (n = 202), there was no difference in incidence of gall stone disease, cholecystitis or cholecystectomy between the surgery and the control groups (log-rank p value 0.432, 0.887 and 0.381, respectively).

Conclusion: GBP and VBG increase the risk for in-hospital treated gall bladder disease and cholecystectomy as compared to controls for up to 26 years after intervention.

PP3.08

Conventional versus fast track anesthesia in an unselected group of patients undergoing revisional bariatric surgery

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Background: Fast track care has proven to be safe and effective in primary bariatric procedures. The number of more complex revisional procedures is expected to rise over the next years.

Objectives The Aim was to evaluate the potential benefits and safety of a fast-track protocol in an unselected group of patients undergoing Roux-en-Y Gastric Bypass (rRYGBP) as revision.

Materials & Methods: For this retrospective study, all patients undergoing rRYGBP between January 2005 and December 2013 were included and categorized between conventional care (CC) and fast track care (FT). Patient characteristics, operative details and intra- and early postoperative complications < 30 days were analysed.

Results: A total of 407 patients were included for analysis. 303 patients (74.4%) received peri- and postoperative treatment according to the fast track protocol. Mean age of the study population was 44.0 ± 8.9 years; mean pre-primary procedure BMI was 45.7 ± 7.0 kg/m². A total of 54 (13.3%) postoperative complications were registered (CC 19.2% vs FT 11.2%; p = 0.038). Both operative time (CC 135.3 ± 42.6 minutes vs FT 79.3 ± 29.3 minutes; p < 0.001) as well as hospital stay (CC 5.1 ± 6.3 days vs FT 3.1 ± 5.3 days; p < 0.001) were significantly shorter in the FT group. A multivariate analysis on postoperative complications showed that fast track was not predictive for the occurrence of complications (OR = 0.853; 95% CI [0.403–1.804]; p = 0.677).

Conclusion: Fast track care appears to be safe and efficient for patients undergoing revisional Roux-en-Y gastric bypass, but postoperative outcome may be highly dependent on surgical experience.

PP3.09

Early weight loss responders to liraglutide 3.0 mg achieved greater weight loss and regression to normoglycaemia, and reduced development of T2D at 3 years, versus early non-responders in the SCALE Obesity and Prediabetes trial

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Background and Aims: SCALE Obesity and Prediabetes (NCT01272219) randomised individuals with prediabetes and obesity (BMI ≥30 kg/m²) or

overweight with comorbidities (≥27 kg/m² with dyslipidaemia or hypertension) to liraglutide 3.0 mg (N = 1505) or placebo (N = 749) as adjunct to diet and exercise for 3 years. This post hoc analysis compared liraglutide 3.0 mg early responders (ERs; ≥5% weight loss at 16 weeks) and early non-responders (ENRs; <5% weight loss at 16 weeks), in keeping with European Medicines Agency stopping-rule criteria.

Methods: Efficacy outcomes are estimated means in ERs (n = 580) and ENRs (n = 210) who completed 160 weeks' treatment. Subjects developing T2D or regressing to normoglycaemia were analysed on the full analysis set with LOCF. Safety was based on the safety analysis set. Placebo data are not shown except for proportion of ERs/ENRs.

Results: Of individuals with week 16 data, for liraglutide 3.0 mg (n = 1302), 68.0% were ERs and 32.0% ENRs; for placebo (n = 640), 22.3% were ERs and 77.7% ENRs. At week 160, greater mean and categorical weight loss, reduced development of T2D, greater regression to normoglycaemia and greater clinical and patient-reported improvements were observed in ERs to liraglutide 3.0 mg vs ENRs (Table). Adverse events (AEs) were similar between groups and reported in 97.1% (ERs) and 95.0% (ENRs). Serious AEs were reported in more ERs (17.7%) vs ENRs (12.7%). Gastrointestinal AEs were similar in ERs (75.3%) and ENRs (71.6%); gallbladder disorders were more frequent in ERs (6.3%) vs ENRs (2.2%).

Conclusion: Among individuals treated with liraglutide 3.0 mg for 160 weeks, greater benefits were observed in ERs vs ENRs, and overall AE rates were similar. The clinical use of a stopping rule for liraglutide 3.0 mg based on early weight loss response therefore helps to optimise long-term treatment outcomes.

Table 1. SCALE Obesity and Prediabetes: endpoints at week 160

[a] n=886 (early responders), n=416 (early non-responders); [b] Increase in score indicates improvement.

Week 0–160	Early responders to liraglutide 3.0 mg n=580
Change in body weight (%)	-8.6
Change in body weight (kg)	-9.1
Proportion achieving ≥5% weight loss (%)	65.4
Proportion achieving >10% weight loss (%)	36.7
Proportion achieving >15% weight loss (%)	19.0
Proportion developing T2D (%) [a]	0.5
Proportion regressing to normoglycaemia (%) [a]	69.8
Change in FPG (mg/dL)	-7.75
Change in FPG (mmol/L)	-0.43
Change in HbA1c (%)	-0.44
Change in SBP (mmHg)	-3.74
Change in SF-36 physical component summary score [b]	+3.68
Change in IWQoL-Lite total score [b]	+13.40

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PP3.10

Cost-effectiveness of the behavioral antenatal care intervention programme Mighty Mums

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Background and Aims: Obesity during pregnancy is associated with both risk of complications and increased healthcare costs. Still, knowledge is insufficient of effective interventions during pregnancy to minimize the health risks for women with obesity and their children.¹ The behavioral

antenatal care intervention programme, Mighty Mums, was directed towards pregnant women with BMI ≥ 30.2

Objectives To evaluate the cost-effectiveness of receiving the Mighty Mums intervention programme, compared to receiving standard antenatal care.

Materials and Methods: The controlled trial of Mighty Mums was conducted during 2011–2013 in Gothenburg, Sweden. All participants received standard antenatal care. Women in the intervention group ($n = 465$) in addition received two extra sessions with their midwife and were offered a set of activities directed towards nutrition and physical activity, in which they participated according to their own personal choices. The control group consisted of two cohorts; 1) women getting standard antenatal care during the same time period ($n = 104$) followed prospectively, and 2) women ($n = 700$) from adjacent geographical areas followed retrospectively using register data. Data were collected during pregnancy and until postpartum checkup using register data and data collected specifically for the study. The cost calculation was based on unit costs for conducted activities and healthcare use, based on National weights of Diagnosis Related Group codes identified from International Classification of Disease version 10 codes and procedure codes.³ The health outcome used in the economic evaluation was gestational weight gain from enrollment in the study to last checkup before partum. Sensitivity analyses were conducted using alternative health outcomes, including changes in self-reported health.

Results: The analysis is ongoing and results will be presented at the conference.

Conclusions: To be presented.

References:

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Acknowledgements: We express our gratitude to midwives and other staff in the antenatal healthcare, and pregnant women, involved in the study.

PP3.12

Effect of amino acids on gastric emptying and gut hormone secretion in non-diabetic obese and lean subjects

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Background & Aims: Nutritional interventions are important elements for modulating appetite, reducing weight and improving metabolism in obesity. Insulin resistance is a key pathogenic factor in the development of obesity. Gastric emptying rates and incretins such as glucagon-like peptide 1 (GLP-1) play a major role in determining insulin release after a meal. Strategies to enhance incretin secretion could provide a therapeutic approach for obesity. Carbohydrates and lipids have been extensively investigated in relation to incretin release. In contrast, the role of proteins or individual amino acids has been less studied and remains an area of controversy.

Objectives To compare the effects of the amino acids L-tryptophan (L-trp) and L-leucine (L-leu) on gastric emptying and gut peptide secretion (GLP-1 and cholecystokinin (CCK)), as well as on plasma insulin and glucose levels, in lean and obese subjects.

Material and Methods: The study was conducted as a randomized, double-blind, parallel-group trial. A total of 10 lean and 10 non-diabetic obese (BMI > 30) participants were included. Subjects received intragastric loads of L-trp (0.52 g and 1.56 g) and L-leu (1.56 g) dissolved in 300 mL tap water; 75 g glucose solution and 300 mL tap water were control

treatments. Solutions were enriched with ¹³C-sodium acetate (for determination of gastric emptying).

Results: i) L-trp dose-dependently stimulates CCK release in lean and obese subjects, ii) none of the amino acids modulated GLP-1 secretion, iii) L-trp induced a significant retardation in gastric emptying in lean subjects ($p = 0.012$), iv) L-trp had only a small effect on insulin ($p = 0.04$) and did not affect glucose concentrations in lean subjects, and v) both L-trp and L-leu induced a small, albeit significant increase in insulin in obese subjects ($p = 0.016$ and $p = 0.008$).

Conclusion: L-trp has an effect on gastric emptying which is probably mediated by CCK. The role of the two amino acids on GLP-1 release was minor and intragastric administration of the amino acids did not change glycaemic control in either lean or in obese subjects.

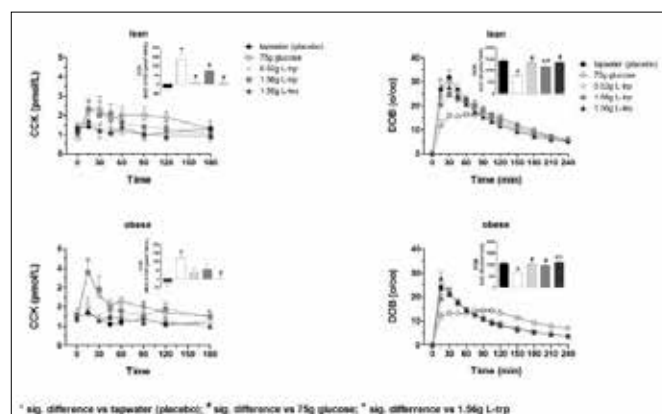


Fig. 1. Plasma CCK concentrations and gastric emptying rates in response to intragastric loads of 0.52 g L-trp, 1.56 g L-trp, 1.56 g L-leu and 75 g glucose in lean and obese subjects. Placebo treatment is 300 mL tap water. AUC, area under the concentration-time curve; DOB, delta over basal. Data are expressed as mean \pm SEM. *, $p \leq 0.05$, statistically significant difference vs. tap water. #, $p \leq 0.05$, statistically significant difference vs. 75 g glucose. +, $p \leq 0.05$, statistically significant difference vs. 1.56 g L-trp. N = 10 lean (5 men and 5 women) and 10 obese (5 men and 5 women).

PP3.13

Obese and overweight hypogonadal men lose weight with long-term treatment with injectable testosterone undecanoate (TU): Real-life data from a controlled registry study

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Background: Long-term testosterone therapy (TTh) in hypogonadal men results in meaningful and sustained weight loss.

Methods: Of 656 men with symptomatic hypogonadism in a registry study (age: 60.7 ± 7.2 years) with testosterone (T) levels ≤ 12.1 nmol/L, 360 men received testosterone therapy (T group) with TU 1000 mg/12 weeks following an initial 6-week interval for up to 8 years. 296 men had opted against TTh and served as controls (CTRL). In the T group, 27 had normal weight, 85 were overweight, and 248 obese. In CTRL, the distribution was 36, 137, and 123. Mean changes over time between the two groups were compared by a mixed effects model for repeated measures with a random effect for intercept and fixed effects for time, group and their interaction. Changes were adjusted for age, weight, waist circumference, HbA1c, blood pressure, and lipids to account for baseline differences between groups.

Results: In obese men, weight (kg) decreased from 112.6 ± 11.1 to 90 ± 7.7 in the T group ($p < 0.0001$) and from 101.6 ± 6.3 to 100.3 ± 4.6 in CTRL (NS). The model-adjusted estimated difference between groups at 8 years -23.3 ($p < 0.0001$). Waist circumference (WC; cm) decreased from 109.7 ± 7.2 to 99 ± 6.1 in the T group ($p < 0.0001$) and from 112.8 ± 5.8 to 112.3 ± 5 in CTRL ($p < 0.01$), difference between groups at 8 years -13.6 ($p < 0.0001$). In overweight men, weight decreased from 87.2 ± 5.3 to 77.7 ± 2.8 in the T group ($p < 0.0001$) and increased from 86.8 ± 5.9 to 88.8 ± 5.8 in CTRL ($p < 0.0001$). The model-adjusted estimated difference between groups at 8 years -11.9 ($p < 0.0001$). WC decreased from 98 ± 3.2 to 92 ± 3.5 in the T group ($p < 0.0001$) and increased from 104.7 ± 4.8 to 106.1 ± 4.7 in CTRL ($p < 0.0001$), difference between groups at 8 years -8.4 ($p < 0.0001$). In men with normal weight, weight decreased moderately in the T group and increased slightly in CTRL. WC decreased from 94.3 ± 2.8 to 89.6 ± 3.3 in the T group ($p < 0.0001$) and increased slightly in CTRL ($p < 0.01$). No patient dropped out.

Conclusions: Long-term TTh with TU in overweight and obese hypogonadal men resulted in reductions in weight while WC also decreased in normal-weight subjects. Untreated controls showed stability or modest increases. Excellent adherence to TU suggested a high level of patient satisfaction.

PP3.14

Liraglutide 3.0 mg in obese/overweight adults with or without prediabetes with baseline BMI <35 vs ≥ 35 kg/m² in the SCALE Obesity and Prediabetes 56-week randomised, double-blind, placebo-controlled trial

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Background: SCALE Obesity and Prediabetes (NCT01272219) randomised 3731 subjects (mean age 45 years, male 22%, mean BMI 38 kg/m², 61% with prediabetes) 2:1 to liraglutide 3.0 mg or placebo (PBO) as adjunct to diet and exercise (D&E) for 56 weeks.

Methods: This post hoc analysis compared efficacy and safety **Results:** for subjects with BMI < vs ≥ 35 kg/m² at baseline. The treatment effect of liraglutide across baseline BMI subgroups was evaluated by statistical testing

of interaction between treatment and baseline BMI subgroup ($n = 1279$ subjects with BMI <35 [liraglutide 3.0 mg 856; PBO 423]; $n = 2383$ with BMI ≥ 35 kg/m² [liraglutide 3.0 mg 1581; PBO 802]).

Results: Baseline characteristics were similar between liraglutide and PBO subgroups (BMI < vs ≥ 35 kg/m²) except for body weight (90.1 and 89.9 kg; 115.1 and 115.0 kg) and prevalence of prediabetes (54.0 and 51.1%; 65.3 and 66.1%); both of which were higher with BMI ≥ 35 kg/m². At 56 weeks, greater mean and categorical weight loss were seen with liraglutide vs PBO in both subgroups (mean: -8.2 and -7.9% ; -2.7 and -2.6%) as well as greater improvements in systolic BP, FPG, and IWQoL-Lite total score. These treatment effects of liraglutide were all independent of baseline BMI (< vs ≥ 35 kg/m²; $p > 0.05$), except for the IWQoL-Lite physical function sub-score, which improved more with BMI ≥ 35 kg/m² ($p = 0.04$). Adverse events (AEs) and serious AEs were generally comparable across BMI subgroups. In both liraglutide subgroups (BMI < or ≥ 35 kg/m²), more subjects reported nausea (40 vs 40%) than PBO (15 vs 15%). Gallbladder disorders were similar in liraglutide subgroups (18 [2.1%] vs 37 [2.3%] subjects) but higher than PBO (3 [0.7%] vs 7 [0.9%] subjects). Similar results were seen for adjudicated events of acute pancreatitis (liraglutide: 2 [0.2%] vs 5 [0.3%] subjects; PBO: 0 vs 1 [0.1%] subject).

Conclusions: The effects of liraglutide 3.0 mg, as adjunct to D&E, on body weight, metabolic control and safety were similar in subjects with baseline BMI < and ≥ 35 kg/m².

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PP3.15

Conversion from sleeve gastrectomy to Roux-en-Y gastric bypass. A single centre experience

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Background: Sleeve gastrectomy (SG) has traditionally been performed as a bridging procedure before biliopancreatic diversion with duodenal switch (BPD-DS) for super-super-morbid obesity. Due to the easy technique and to the excellent weight loss on the short period it has emerged as an outstanding procedure in its own right. On the other hand the

Results: on the long term are still on discussion. In case of failure of SG, a conversion to gastric bypass (LRYGB) seems the most appropriate procedure to choose. The aim of the present study was to assess our experience with SG conversion to LRYGB.

Table 1. to PP3.13 Differential effects in T group and CTRL in men in different weight categories data are shown as means \pm SD

	baseline	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8
obese weight (kg)									
T group	112.6 ± 11.1	109 ± 10.8	103.6 ± 10.4	100.2 ± 9.4	97.5 ± 9	95.8 ± 8.3	93.1 ± 7.7	91.4 ± 7.6	90 ± 7.7
CTRL	101.6 ± 6.3	102.2 ± 6.9	102.4 ± 6.7	102.8 ± 7	102 ± 5.7	102 ± 5.5	101.7 ± 5.5	100.8 ± 5.2	100.3 ± 4.6
overweight weight (kg)									
T group	87.2 ± 5.3	85.8 ± 4.7	83.2 ± 4.2	82 ± 4.2	81.1 ± 3.5	80.4 ± 3.4	79.5 ± 3.8	78.4 ± 3.5	77.7 ± 2.8
CTRL	86.8 ± 5.9	87.1 ± 5.9	87.3 ± 6.1	87.6 ± 6.1	87.9 ± 6.2	87.9 ± 6.3	88.5 ± 6.3	88.5 ± 6	88.8 ± 5.8
normal weight weight (kg)									
T group	75.8 ± 4.4	75.8 ± 3.8	75.9 ± 3.9	75.3 ± 3.7	75.7 ± 3.4	76.3 ± 2.8	75.4 ± 2.6	74.8 ± 2.1	74.1 ± 2
CTRL	76.9 ± 2.7	76.8 ± 3	76.9 ± 3.1	77.3 ± 3.4	77.3 ± 3.2	77.8 ± 3.2	77.7 ± 3.2	77.9 ± 2.8	77.2 ± 1.8
obese waist circumference (cm)									
T group	109.7 ± 7.2	107.6 ± 6.9	104.5 ± 6.6	102.7 ± 6.5	101.7 ± 6.3	101.4 ± 6.1	100.6 ± 6	99.9 ± 6	99 ± 6.1
CTRL	112.8 ± 5.8	113.3 ± 6.2	113.6 ± 6.3	114.1 ± 6.6	113.6 ± 5.8	113.7 ± 5.7	113.5 ± 5.5	113.2 ± 5	112.3 ± 5
overweight waist circumference (cm)									
T group	98 ± 3.2	97.1 ± 2.8	95.5 ± 2.6	94.6 ± 2.7	94.1 ± 2.7	93.7 ± 2.8	93.3 ± 3	92.9 ± 3	92 ± 3.5
CTRL	103.7 ± 4.8	104 ± 4.8	104.2 ± 4.9	104.4 ± 5	104.7 ± 5.1	104.9 ± 5.2	105.4 ± 5.2	105.5 ± 5.3	106.1 ± 4.7
normal weight waist circumference (cm)									
T group	94.3 ± 2.8	94.1 ± 2.5	93.8 ± 2.2	93 ± 2.5	92.4 ± 2.8	91.5 ± 3.1	91.1 ± 3.1	90.6 ± 3.4	89.6 ± 3.3
CTRL	97 ± 2.7	97 ± 2.8	97.1 ± 3	97.4 ± 3.1	97.5 ± 2.7	97.9 ± 2.9	97.8 ± 3	98.2 ± 3.2	98 ± 2

Methods: In our department 22 patients underwent conversion from SG to LRYGB from January 2011 to December 2015. Three of them had a major gastro-oesophageal reflux not respondent to the pharmacological therapy with high dose of PPI. In one case a sliding hiatal hernia was present, while in the other two cases a major oesophageal dilatation was identified. The other nineteen patients presented either an insufficient weight loss, or an important weight regain. The sample group of patients has a mean age of 42.3 years and a mean BMI of 40.9 Kg/m².

Results: The mean interval between the two surgical procedures was 42.3 months. Weight loss was significantly improved after conversion with a mean percentage of excess body mass index loss (%BMIL) of 40.1% at the 6-month follow up, and at 57.4% at the 12-month follow up, versus 28.2% before conversion. Patients who underwent conversion to LRYGB following the development of an intractable gastro-oesophageal reflux did not require further postoperative medications at 12 months. Only one postoperative complication was observed in the form of a leakage at the level of the gastro-jejunal anastomosis (4.5%). The leakage was treated with a 2-week course of antibiotics and enteral nutrition over a period of 30 days.

Conclusions: The increasing number of patients undergoing SG will lead to an increasing amount of failed procedures. According to our experience for the treatment of insufficient weight loss or weight regain and severe gastro-oesophageal reflux after sleeve gastrectomy, conversion to LRYGB is a secure and valuable procedure.

Friday, 3 June, 2016

PP4 – Health, Behaviour and Environment II

PP4.01

Physical activity is inversely associated with body fat but not with BMI in preschool children (SPLASHY)

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Background and Aims: Previous studies found that physical activity (PA) has an impact on body composition in older children (1). However, in young children, the evidence on the association of PA with body composition is still scarce and controversial (2). Objectives: To determine the association of physical activity with body mass index (BMI) and body fat in 2–6 year old preschoolers.

Material/Methods: 476 preschool children (mean age 3.9 yrs \pm 0.7; 251 boys and 225 girls) participated in a Swiss Preschooler's Health Study (SPLASHY). Physical activity was measured using accelerometers which were worn at least 10 h/day over a period of 7 consecutive days. PA data was then categorized into different intensities using cut-offs of Butte 2014 (3). Measures of body composition included BMI and the sum of four skinfolds (body fat).

Results: In our study, 18% of preschoolers were overweight, while 5% were classified as obese (WHO criteria). Multilevel model analyses showed that vigorous PA was inversely related to body fat. This relation remained after

adjusting for age, sex, socio-economic status, socio-cultural region, birth weight, and maternal BMI. Moreover, different measures of PA were positively associated with BMI, but these associations were no longer significant after adjustments.

Conclusion: In preschool children and in the context of a low obesity prevalence, physical activity is inversely associated with direct body fat measure, but not with BMI. In this population, BMI may not be a good measure of excess body fat and possibly even represent fat-free mass. Skinfold thickness or other measures of body fat are likely the preferred instrument to measure adiposity. Vigorous PA may play a protective role in adiposity development.

References:

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3 Butte et al. Med Sci Sports Exerc, 2014. 46 (6): p.1216–1226.

Table 1. Descriptive characteristics of the participants.

Data are shown per changes in 100cpm and per 10min intervals for the time in the respective intensities. NW= normal weight; OW= overweight; OB= obese; ISEI= international socio-economic index; BMI= body mass index; TPA= total physical activity; LPA= light physical activity; MPA= moderate physical activity; MVPA= moderate-and-vigorous physical activity; VPA= vigorous physical activity; SED= sedentary time; cpm= counts per minute; min/d= minutes per day.

Characteristics	Total (n = 476)	NW (n = 357)	OW/OB (n = 106)	P-value
Age (years)	3.89 \pm 0.69	3.91 \pm 0.67	3.83 \pm 0.75	0.13
Gender				
Boys, n (%)	251 (52.7)	190 (75.7)	56 (22.3)	0.94
Girls, n (%)	225 (47.3)	167 (74.2)	50 (22.2)	
Body composition				
Body mass index (kg/m ²)	16.02 \pm 1.35	15.49 \pm 0.86	17.82 \pm 1.14	<0.001
Waist circumference (cm)	51.85 \pm 3.52	50.89 \pm 2.96	55.07 \pm 3.4	<0.001
Skinfold thickness (mm)	25.97 \pm 5.53	24.78 \pm 4.63	29.84 \pm 6.49	<0.001
Socioeconomic/cultural				
ISEI	61.85 \pm 15.9	61.80 \pm 15.68	61.80 \pm 17.39	0.73
Maternal/early life				
Birth weight (kg)	3.29 \pm 0.55	3.27 \pm 0.55	3.40 \pm 0.52	0.04
Maternal BMI (kg/m ²)	22.65 \pm 3.81	22.45 \pm 3.70	23.47 \pm 4.23	0.02
Physical activity				
TPA (cpm)	621.52 \pm 153.6	617.90 \pm 144.91	634.03 \pm 174.72	0.51
LPA (min/d)	354.34 \pm 46.34	353.27 \pm 46.26	357.03 \pm 46.27	0.56
MPA (min/d)	40.25 \pm 20.37	39.57 \pm 18.73	42.69 \pm 24.48	0.33
MVPA (min/d)	45.42 \pm 23.2	44.69 \pm 21.17	47.99 \pm 28.31	0.39
VPA (min/d)	5.17 \pm 5.51	5.11 \pm 5.12	5.31 \pm 6.54	0.85
SED (min/d)	365.81 \pm 56.41	368.21 \pm 55.06	357.86 \pm 59.14	0.12

Acknowledgment: The study was funded by the Swiss National Research Foundation and the Jacobs Foundation.

Detailed analyzes of the relation between childhood BMI and gain in height during puberty, separated into different components

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Background: We have previously found that childhood BMI is inversely related to pubertal height gain: overweight/obese children of both genders have less specific pubertal height gain. The QEPS-model (describing total growth in height as a combination of four mathematical functions), can be used for calculation of estimates of pubertal growth¹. Growth in height during puberty can be described as a combination of continuous ongoing growth, Q(ES), and a specific pubertal growth function, P.

Objectives: To investigate the importance of when overweight/obesity starts during childhood in relation to subsequent growth in height during puberty; and to study the relationship between childhood BMI and pubertal growth functions from the QEPS-model in greater detail than previously presented.

Material/Methods: The longitudinally followed GrowUpGothenburg 1990 birth cohort, with growth data from birth until adult height was analyzed, using the QEPS-model. Individual BMI-SDS values, from 3.5–8.0 years of age (n = 1901) were calculated for linear and subgroup analyses (normal /underweight, NwUw, overweight/obese, OwOb), based on the IOTF 2012 reference². Relationships between childhood-BMI and total pubertal height gain were considered according to P-function and Q(ES)-function.

Results: We found no significant difference in pubertal height gain depending on when in childhood the BMI-SDS peaked, in either sex. In general, the total pubertal growth in girls depended more on the continuous Q(ES)-function than P-function and this balance was shifted towards less P-function with higher BMI-SDS, especially for Ob girls (figure, left). NwUw boys had pubertal gain mostly from the P-function, for the Ow boys the pattern was more mixed and for Ob boys all had less P- than Q(ES)-function (figure, right).

Conclusion: The results of the present study have shown that the reduced pubertal gain in height for OwOb children is not related to when during childhood the BMI peaked. For both genders, the pubertal gain shifted to less specific pubertal growth (P) and relatively more continuous growth (Q(ES)) with higher BMI-SDS.

References:

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2 Cole TJ, Lobstein T. *Ped.obesity*.2012;7(4):284–94.

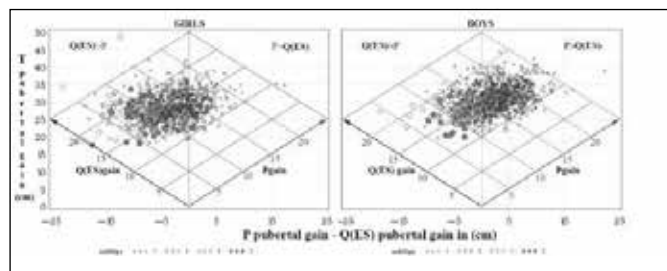


Abb. 1. The pubertal height gain divided to the specific pubertal (P) gain and the ongoing continuous Q(ES)-function
The increase in height during puberty is divided to the specific pubertal gain from the P-function (Pgain) and the ongoing continuous Q(ES)-function (Q(ES)gain)

from the QEPS-model, girls, left, boys, right. The pubertal gain is expressed as a subtraction on the horizontal axis and total pubertal gain (T pubertal gain) on the vertical axis. The total pubertal gain can be evaluated using the transverse lines for each variable. The oblique blue line, with its transverse blue isolines, represents Q(ES) pubertal gain, and the oblique red line, with its transverse isoline, represents Pgain. The different symbols represent each individual with childhood BMI-SDS of: normal weight (blue open circles), underweight (blue crosses), overweight (red open circles) and obesity (red filled circles).

Maternal Blood Lipid Profile during Pregnancy impacts on Child Adiposity: Findings from the ROLO Study

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Background: The in utero environment is known to affect fetal development however many of the mechanisms by which this occurs remain unknown. With 25% of Irish children overweight or obese, it is vital to understand how maternal diet during pregnancy influences a child's body composition. While research shows Triglycerides (TG) in women with hyperglycaemia can influence birth weight, little is known about the impact of maternal blood lipid profile in euglycemic women.

Methods: Analysis was carried out on 290 mother-child pairs from the ROLO study (Randomised cOntrol trial of LOw glycaemic index diet). Fasting maternal blood lipids and levels of Leptin and HOMA from euglycemic women were measured in early and late pregnancy and cord blood. Infant anthropometry and skin fold thicknesses were recorded at birth, 6 months and 2 years of age.

Results: Level of dietary saturated fat was positively associated with total blood cholesterol levels and levels of circulating maternal blood lipids were found to increase during pregnancy. Many associations were found between the maternal blood lipid profile and infant anthropometry using linear correlations and these were then entered into multiple regression models. TG in late pregnancy had a positive association with birth weight (p = 0.03) while TG in cord blood had a negative association (p = 0.01). Similar models were found for birth weight centile. HDL had a positive association with weight at 6 month (p = 0.005). In the final models no other maternal blood lipids had an impact on weight or adiposity up to two years.

Conclusion: In this cohort, maternal TG levels were associated with weight at birth and HDL was associated with weight at 6 months of age. These results suggest that maternal lipid concentrations may exert an in-utero influence on later infant body composition. With dietary intakes of saturated fat influencing blood lipid profiles there is the potential to modulate infant body composition by altering the mother's diet during pregnancy.

Healthy diet score: Design, application and association with future overweight

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Background & Aims: Diet quality scores are widely used as indicators for adherence to dietary guidelines and they allow for the investigation of associations between food patterns and health outcomes. The aim of this

study was to develop a healthy diet score (HDS) based upon the official recommendations from national food councils of eight European countries and to look at the degree of HDS adherence in children participating in the IDEFICS Study. A further aim was to determine whether the HDS is prospectively associated with overweight and changes in BMI status.

Material & Methods: Children aged 2–9 years from survey centres in Italy, Estonia, Cyprus, Belgium, Sweden, Germany, Hungary and Spain were included at baseline. Food intake was assessed by food frequency questionnaires (FFQ). Parents or caretakers reported the meals eaten by the child at home at baseline (2007/08) and follow up (2009/10). Weight and height were measured, and BMI was calculated. National recommendations regarding the nutrition of children were collected and compiled to establish consistent recommendations. FFQ data of 14269 children were converted into a HDS, consisting of five sub scores reflecting adherence to specific nutritional guidelines on consumption of fruit and vegetables, fish, whole grains, fat quality, and sugar. The HDS ranges from 0 to 50 and higher values indicate higher adherence to recommendations. Prospective analyses using logistic regression were performed.

Results: A large variability of the HDS was found across the countries. The mean total score at baseline ranged from 19 (Spain, Italy) to 32 (Sweden). High HDS at baseline was inversely associated with overweight at follow up. After adjustment for country, age, sex, BMI z-score, parental education, and study centre in the longitudinal model the inverse association of HDS with risk of overweight remained significant.

Conclusion: An operational definition of adherence to dietary guidelines in eight European countries has been developed. In a large cohort of European children, high HDS values at baseline predicted a healthier weight status 2 years later.

PP4.05

Reframing corporations and regulatory activity in the obesity epidemic

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Method: The paper will be based on: (i) Conceptual and legal analysis of corporations, as they have emerged in modern capitalist economies. Recent developments in corporate legal theory have shown how corporations are creatures of the state, not pure market actors. That is, a “free market,” in the sense of classical economics or liberal theory, would not include corporations. (ii) Normative analysis of standard claims about the motivations and possible actions of corporations. Advocates of self-regulation implicitly claims that companies are able to take account of public goods such as health. By contrast, many advocates of corporate regulation claims that companies are obliged to put profit before any other consideration, including the health of consumers. These standard lines of argument contradict one another.

Results: With regard to (i), we see that the structure and motivations of corporations are heavily shaped by legal regimes that allow corporations to exist and operate. This means that interpreting regulation as an interference in markets or a limit on commercial prerogatives must be mistaken. Corporate activity is already regulated through and through, since corporations depend on state authority in order to exist and act in the first place. With regard to (ii), the previous analysis shows that there is no duty, legal or otherwise, for corporations to pursue profitability. At the same time, commercial pressures do limit companies’ options for prioritising public health, especially in the food and drink sectors. “Self-regulation” cannot address this problem.

Conclusions: To challenge the formidable power of Big Food, public health advocates should reject the standard framing of corporations as ‘free market’ actors. Regulation in the interests of public health is a proper quid pro quo for the state authorisation that brings corporations into existence in the first place. Such regulation will be more effective and supportable, the more it is appreciated that corporations and the markets they create are neither free nor natural, but profoundly artificial.

PP4.06

Obesity continues to increase in the majority of the population in mid-Sweden – A 12-year follow-up

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Background: The **Aim:** was to investigate trends in the prevalence of obesity by age and level of education in the general population in mid-Sweden from year 2000 to 2012.

Methods: A postal questionnaire was sent to a random population sample aged 25–74 years in years 2000, 2004, 2008 and 2012. The overall response rates were 67%, 65%, 60% and 53%, respectively, and the study included 29017, 27385, 25910 and 24152 respondents, respectively. Obesity (BMI > 30 kg/m²) was based on self-reported weight and height.

Results: The age-standardised prevalence of obesity increased from 13% to 17% in women and from 12% to 17% in men between 2000 and 2012. Obesity increased in all age groups from 2000 to 2008 and continued to increase among the middle aged (45–64 years) between 2008 and 2012. The socioeconomic gradient in obesity changed during the study period since the absolute increase in obesity was steepest at the middle educational level. In 2012, the prevalence of obesity was almost twice as high at both middle and low educational levels compared with high educational level. The “true” prevalence of adult obesity, corrected for self-reported weight and height, was around 20% in 2012 for both men and women.

Conclusion: In the majority, among the middle-aged and those with secondary education, the prevalence of obesity continued to increase even between 2008 and 2012.

PP4.07

Treating obesity by reducing the speed of eating

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Objectives: Do obese patients eat with an increased speed and do they lose weight by practicing eating at a reduced speed? **SUBJECTS:** 354 (87% female) patients with a median (range) age = 37.6 (7.8–83.1) years and BMI = 35.5 (23.5–87.3) kg/m² (no sex differences) and 27 (74% female) age-matched (35.5 (25.5–56.8) years), normal weight (BMI = 22.1 (18.7–25.4) kg/m²) participated.

Methods: 164 (87% female) of the patients and the controls ate during one week using Mandometer, which is a scale connected to a computer. The subject eats food from a plate on the scale and the computer records the weight loss of the plate. They served themselves foods they normally eat and they were encouraged to eat twice/day for five consecutive days. All 354 patients practiced eating at a reduced speed assisted by feedback on the Mandometer screen. This is possible because the patient can see her/his own speed of eating emerging on the screen during the meal and thus adapt to the feedback (Figure). The patients visited the clinic weekly over one year. Their eating behaviour was measured at admission and discharge without feedback on the Mandometer screen.

Results: 75% of the subjects ate ≤6 meals using Mandometer. Food intake (336 (229–568) g) and speed of eating (37 (23–102) g/min) amongst normal weight controls were lower, although not significantly so, than those of the obese subjects (369 (154–1053) g) and 44 (13–117) g/min). Practicing eating at a reduced speed decreased the BMI (from 35.3 (23.5–87.3) to 33.4 (20.9–69.4) kg/m²), food intake (from 377 (200–1174) to 300 (175–800) g) and speed of eating (from 41 (16–142) to 28 (13–142) g/min) amongst the obese subjects (all differences p < 0.01).

Conclusions: Obese humans can show a relatively normal eating behaviour and practicing eating less food at a reduced speed reduces their

weight. Preliminary results indicate that the reduction on body weight reported here is maintained over two years of follow-up. (NCT02381327 at clinicaltrials.gov)

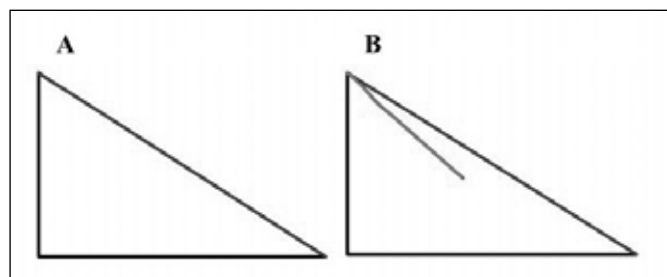


Fig. 1. Representation of graphics seen on Mandometer screen during training. A-blue training line presented to user to follow while eating. B-red line develops as food is consumed. In this case, food is being consumed too quickly and the computer would encourage user to eat a little slower to approximate red line to training line.

PP4.09

Mobile applications ('apps') for weight management: Current market characteristics

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Background and Aims: Overweight/obesity presents major health challenges worldwide, demanding new, cost-effective approaches for treatment and prevention. Mobile 'app' technology offers new potential to generate behavioural changes among receptive, younger, population sectors, which are vulnerable to obesity but currently hard-to-reach for obesity prevention.

Objective: To assess the current market of mobile apps for weight management.

Material/Methods: Searches of Apple iTunes App-store and Google Play Store, in US, UK, and Singapore using key words: 'weight', 'weight-management', 'calorie', in December 2015. Duplicates and apps unrelated to the topic in humans were excluded. Retrieved results were recorded in an Excel spreadsheet, for price, download-frequency, customer-rating and developer.

Results: A total of 3,013 available relevant apps were identified, with a total of 666,169,136 million downloads for both free and paid apps. Google Play Store had 2,196 apps (1,808 free, 82%) and Apple iTunes had 817 (352 free, 43%) available. Google Play Store had significantly more apps available free of charge compared to Apple iTunes store ($x_2 = 83.5$, $p < 0.0001$). Identified apps' content was mainly on body weight, exercise and calorie intake recording and monitoring. None of the apps identified had been developed by a certified health organization or university. There is no published data on effectiveness of apps for weight management or weight-gain prevention, to date.

Conclusion: Apps on lifestyle advice for weight management are very popular, but currently they all lack certified content expertise or evidence of effectiveness. Transferring previously-tested, effective, online materials for weight-management or obesity prevention into 'app' form would assure content quality for use and evaluation in clinical or public health settings.

PP4.10

A critical discourse analysis of Canadian obesity prevention public health policies

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Background: Obesity is a public health issue because it threatens to significantly impact population health through related chronic diseases. Population level data indicating rising levels of childhood obesity have prompted Canadian federal, provincial and territorial (FPT) governments to make obesity a collective priority. Public health policies are a means for governments to disseminate dominant forms of knowledge (narratives) regarding particular issues. Obesity prevention policies have been criticized for promoting a simplistic narrative that may contribute to myths and misconceptions about obesity and people with obesity, which ultimately lead to broad-based and pervasive weight bias in our society. Conducting a critical analysis of obesity prevention public health policies can help us identify normative messages and dominant obesity narratives disseminated to the public. Unpacking these narratives can reveal opportunities for reflection and change.

Objective: The objective of our study was to critically review Canadian obesity prevention public health policies and identify underlying dominant obesity narratives.

Method: We applied Bacchi's 'what's-the-problem-represented-to-be?' (WPR) approach to identify assumptions and dominant narratives in provincial and federal obesity prevention public health policies. A total of seven policy documents were reviewed. Data collection stopped at the point of saturation.

Results: Canadian obesity prevention public health policies enact a dominant narrative that obesity is a lifestyle condition that can be prevented through healthy eating and physical activity. Although obesity is framed within a socio-ecological model of health, most solutions are still framed within an individual behaviour change model. Canadians are called to change the "obesogenic" environment so that individuals can preserve a healthy body weight, but few policies provide actual guidance on the implementation of specific government action. The healthy weight discourse in these policies normalizes the idea of self-controlled citizens and elevates weight status to a high moral calling. Few policies acknowledge weight bias or propose weight bias reduction strategies.

Conclusion: Public health policy makers need to critically reflect on the unintended consequences of obesity prevention strategies and aim to eliminate narratives that create oppressive identities for people with obesity.

PP4.11

Improving cardiometabolic health by adjusting the obesogenic environment in severe mentally ill inpatients: A randomised controlled trial

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Introduction: Poor cardiometabolic health in severe mentally ill (SMI) patients, mostly schizophrenia, reduces life expectancy up to 30 years, partly due to unhealthy lifestyle behaviours. The Effectiveness of Lifestyle Interventions in PPsychiatry trial (ELIPS) aimed at improving SMI inpatients' cardiometabolic health by addressing the obesogenic environment, focusing on diet and physical activity.

Methods: ELIPS is a multi-site cluster randomised controlled trial. Residential and long-term clinical care teams were randomised to intervention (N = 15) or control (N = 14) arm, resulting in 365 and 371 patients per arm, respectively. In the intervention, lifestyle coaches supported teams in improving healthy behaviours in patients according to pre-set study goals for three months, followed by monitoring for nine months. Control patients received care as usual. Waist circumference (WC) and body mass index (BMI) were measured at baseline, 3 and 12 months. Data were analysed intention-to-treat using multi-level linear mixed models with adjustment for age, gender, residential or long-term setting and antipsychotic medication.

Results: Data of 365 intervention and 371 control patients (48.5 ± 12.5 years, 63.2% men) showed a decrease in waist circumference of 1.51 cm (95% CI = -2.99; -0.04; p = 0.044) in the intervention group compared to the control group after three months and a tendency for a decrease of 1.28 cm (95%CI = -2.79; 0.23; p = 0.097) after twelve months. The intervention had no effect on BMI at three and twelve months.

Conclusion: Improving the obesogenic environment for SMI inpatient had small but beneficial effects on waist circumference. In general, heterogeneity in the observed changes was large. Future analyses should consider non-response in the intervention teams and uncontrolled lifestyle activities in the control teams. If sustained over a longer period of time, a small step approach focussed on the obesogenic environment of patients who live in sheltered and long-term care facilities may have the potential to produce clinically relevant reductions in adiposity and thereby reduce cardiometabolic risk.

Acknowledgement: This study was funded by a ZonMW grant (171101002).

PP5 – Clinical Management II

PP5.01

Mental health status in treatment-seeking young adults with obesity compared with matched normal-weight young adults: Case-control study

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Background and Aims: Studies suggest an inverse association between obesity and mental health, although there is uncertainty about this association for young adults. Young adulthood is a vulnerable period for weight gain and incidence of psychiatric disorders.

Objectives: To compare the prevalence of mental health problems in young adults (18–25 y) with severe obesity enrolling in a specialist obesity treatment clinic in Stockholm, Sweden, with young adults in the general population. We also explored potential differences in mental health between the obese treatment-seeking patients and obese non-treatment-seeking controls.

Material & Methods: Case-control study of 119 patients (mean BMI 39.8 kg/m², SD 5.3, mean age 20.8, SD 2.3, 81% women), and 363 controls (BMI 22.4 kg/m², SD 2.3, age 20.8, SD 2.3, 81% women), matched for age, gender and socioeconomic status. Participants completed a questionnaire on present mental and physical health. Results were analysed by independent samples t-test, univariate analysis of variance and logistic regression

with established cut-offs for mental illness, using General Health Questionnaire (GHQ-12) as the primary outcome. Patients were also compared to two groups of matched controls (age, gender, socioeconomic) with a mean-BMI of 34.4 (n = 107) and 40.0 kg/m² (n = 36) respectively.

Results: GHQ-12 (likert-scoring) was 26.8 points (estimated marginal means, 95% CI:25.7–27.9) in patients and 23.0 in controls (95% CI:22.3–23.6)(p < 0.01, higher scores denote poorer mental health) with an adjusted odds ratio for mental illness of 2.2, 95% CI:1.4–3.6 when controlling for gender, age, smoking, alcohol, pain and sexual orientation. In patients, mental illness was associated with non-heterosexuality, non-smoking and pain (all, p ≤ 0.03). Using independent samples t-test, patients scored higher in GHQ-12 than matched control groups with a mean-BMI of 34.4 or 40.0 (22.8 and 23.1 points respectively, both p < 0.01).

Conclusion: Treatment-seeking young adults with obesity constitute a risk group for mental illness compared to controls from the general population. The poor mental health status may constitute a major barrier to treatment progress.

PP5.02

Who's getting engaged? Factors associated with parent engagement when up-scaling the PEACH™ program for overweight primary school aged children

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Background & Aims: Parenting, Eating and Activity for Child Health (PEACH™) is a lifestyle intervention for parents of overweight primary school-age children demonstrated to be efficacious in a RCT. (1) In Queensland (Australia) PEACH™ is being translated to a large scale community intervention with a pre- post- evaluation design. PEACH™ Qld comprises nine facilitated group sessions and a final review and measurement session at six months. Engagement (recruitment and retention) of parents and children is critical to achieving program outcomes but is proving challenging. The aim is to explore factors associated with parent engagement and the potential need for adaptation of implementation processes, to improve engagement when upscaling.

Objectives: To examine associations between socio-demographic and parent characteristics and session attendance and whether these relationships were mediated by parent and child factors.

Methods: This study use baseline data collected from parents who attended at least one session of the PEACH™ Qld program. Parent attendance was treated as a continuous variable. Data relating to: socio-demographic factors, program referral, parent beliefs and self-efficacy and child behaviors (diet, physical activity, screen time) were utilized. Mediation analyses were performed using multi-level regression analyses (participants-in-intervention group).

Results: 519 children (467 families) were enrolled. 79% (n = 411) of children (with a parent) attended at least one session. Attendance was Mean 5.7 ± 3.2; Median 7 (IQR 3–9) sessions. The children (55% girls) were 9.0 ± 1.8 years old. Socio-economic status (SES) and education level, were directly associated (p < 0.01) with parent attendance/engagement. Single parents (p < 0.05) and those referred by a health professional (vs self-referral, p < 0.01)) had lower attendance rates. Parent beliefs and child behaviors did not mediate associations between socio-demographics factors and attendance rates.

Conclusion: Neither parent beliefs of child behavior explained differences in attendance. Research is required to understand what/how program-level

el factors (e.g. facilitator, intervention or setting characteristics) impact parent engagement. This understanding could assist in promoting program reach and effectiveness when upscaling evidence-based programs.

Acknowledgement: PEACH™ Qld funded by the Queensland Government 1. Pediatrics 2011;127:214–222

PP5.03

Body Composition after Gastric Bypass and Duodenal Switch – a Comparison with BMI-matched Non-operated Controls

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Background: The possibility of unfavorable loss of Fat Free Mass (FFM) after Roux-en-Y Gastric Bypass (RYGB) and Duodenal Switch (BPD/DS) is an ongoing cause for concern.

Objectives: To examine whether weight loss after RYGB and BPD/DS is characterized by unfavorable loss of FFM.

Methods: Comparison of body composition and Resting Metabolic Rate (RMR), studied with air-displacement plethysmography and indirect calorimetry assessment in weight-stable RYGB (n = 17) and BPD/DS patients (n = 12) with BMI (Body Mass Index)-matched non-operated controls (n = 43), all with BMI 28–35.

Results: Body composition after RYGB and BPD/DS was similar to the non-operated group. In an analysis of the whole group (male:female ≈ 1:2) a tendency towards higher percentage of fat free mass (FFM%) in BPD/DS (61.1% vs. 57.4% and 56.5%, p = 0.051) was found. Analysis of the women's results showed a higher absolute FFM in both the RYGB group and the BPD/DS group (both p < 0.05) compared with controls, as well as higher FFM% after BPD/DS (p < 0.05). RMR in women was higher in both operated groups, 1458 and 1508 kcal/24h vs. 1306 kcal/24h in controls (both p < 0.05).

Conclusion: RYGB and BPD/DS result in a body composition similar to that of non-operated subjects, despite the massive weight loss and nutritional limits. The increased FFM and RMR in women after RYGB and BPD/DS compared with controls may contribute to the favorable metabolic effects and maintenance of long-term reduced bodyweight. The current study does not provide any evidence for adverse effects on body composition and RMR after bariatric surgery.

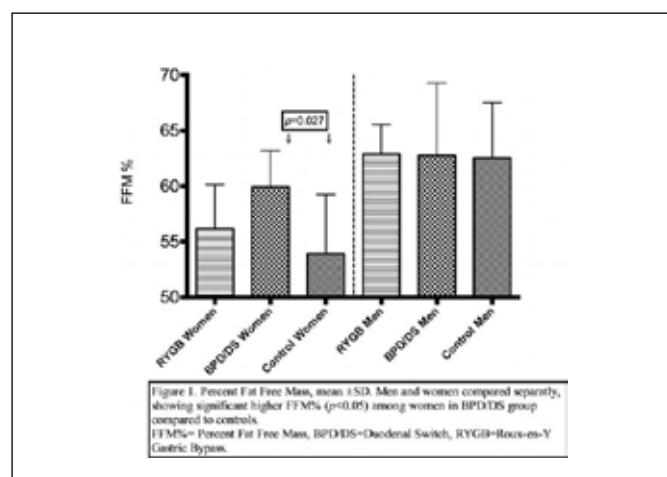


Fig. 1.

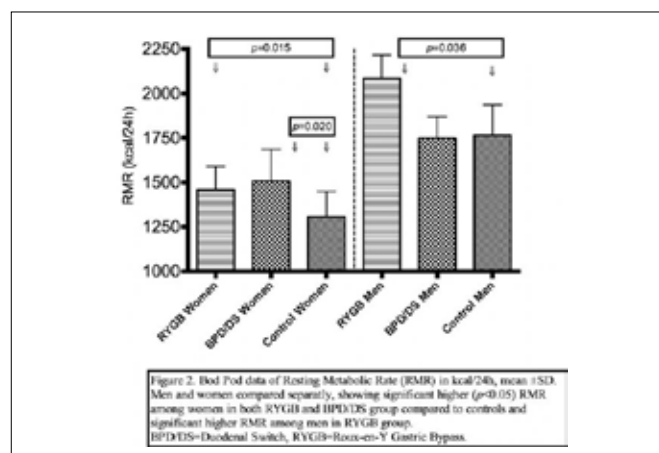


Fig. 2.

PP5.04

Reflux Management With the LINX® System for Gastroesophageal Reflux Disease After Laparoscopic Sleeve Gastrectomy

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Introduction: Gastroesophageal reflux disease (GERD) -refractory to medical therapy- can be a challenging situation following Sleeve Gastrectomy due to the treatment limitations since the gastric fundus to perform fundoplication is no longer an option. Here we report our preliminary Results of our ongoing prospective study if the LINX® system is a safe and effective option for patients with GERD after sleeve gastrectomy.

Methods: Inclusion criteria: Laparoscopic sleeve gastrectomy (LSG) for obesity, performed >12 months prior to proposed device implantation date, patient must be a surgical candidate above 21 years old, a documented pathologic esophageal manometry and esophageal acid exposure by pH monitoring without GERD medications for at least 7 days prior to testing, chronic GERD symptoms despite maximum medical therapy for the treatment of reflux and at least, 30% loss of excess weight from the original date of LSG surgery. Currently 3 Patients fulfilling the above criteria have the LINX® placed, while 7 patients are evaluated but not yet operated. These 3 Patients were followed up as scheduled after 2 weeks and 3 months, with excellent elimination of reflux symptoms and they are scheduled for the upcoming follow-ups after 6 months and 12 months. ClinicalTrials.gov Identifier: NCT02429830

Results: All patients were noted to have clinical, endoscopic and self-reported greatly improved gastroesophageal reflux symptoms after their procedure. They were all noted to have significant improvement in severity and frequency of reflux, regurgitation, epigastric pain, sensation of fullness, dysphagia, and cough symptoms in their postoperative GERD symptoms compared with their preoperative evaluation. The operation method is feasible and duration is comparable to primary LINX implants in normal weight reflux patients.

Conclusion: LINX® device is a safe and effective option in patients with refractory gastroesophageal reflux disease after a laparoscopic sleeve gastrectomy despite appropriate weight loss.

The effect of surgical and non-surgical weight loss on N-terminal pro-B-type natriuretic peptide and its relation to obstructive sleep apnoea

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Background & Aims: Obesity is a major risk factor for obstructive sleep apnoea (OSA) and heart failure, but obesity is also associated with paradoxically low levels of serum N-terminal pro-B-type natriuretic peptide (NT-proBNP).

Objectives: In subjects with severe obesity undergoing weight loss treatment we assessed the associations between changes in severity of OSA and serum NT-proBNP levels.

Material/Methods: One-year non-randomised controlled clinical trial. A total of 76 subjects underwent laparoscopic Roux-en-Y gastric bypass surgery [53 (70%) female, mean (SD) age 43 (11) years, BMI 46.7 (5.7) kg/m²] while 63 subjects attended an intensive lifestyle intervention program [44 (70%) women, age 47 (11) years, BMI 43.4 (5.0) kg/m²]. Sleep recordings and blood tests were assessed before and one year after interventions. Subjects were dichotomised into low apnoea hypopnoea index (AHI, <15 events/hour) and high AHI (≥15 events/hour) groups. The reference group included 30 healthy and normal weight volunteers [67% female, BMI 22.7 (1.5) kg/m² and age 42.6 (8.5) years].

Results: Mean (SD) weight reduction was 30 (8) % in the surgery group and 8 (9) % in the lifestyle group. Median (25–75 percentiles) NT-proBNP-levels at baseline did neither differ between the surgery and lifestyle groups [6.4 (4.1–10.3) versus 6.7 (4.4–10.7) pmol/l, $p = 0.612$] nor between the low and high AHI groups [7.0 (4.7–10.3) versus 5.7 (3.7–11.9) pmol/l, $p = 0.458$]. The increase in NT-proBNP was significantly higher in the surgery than in the lifestyle group [5.9 (8.8) versus 2.0 (7.3) pmol/l, $p = 0.007$]. The one year NT-proBNP levels were in both intervention groups higher than in the normal weight reference group [7.4 (3.5–9.6) pmol/l, $p < 0.001$ and $p = 0.010$, respectively]. In the whole study population Δ NT-proBNP correlated negatively and significantly with both Δ BMI ($r = -0.213$, $p = 0.014$) and Δ AHI ($r = -0.354$, $p < 0.001$). There were no significant group interactions. Δ NT-proBNP was, independent of age, gender and Δ BMI, significantly associated with Δ AHI (beta -0.216, $p = 0.021$).

Conclusion: Gastric bypass surgery was associated with a greater increase in NT-proBNP concentrations than non-surgical weight loss treatment. The increase in NT-proBNP was associated with weight loss and reduced AHI.

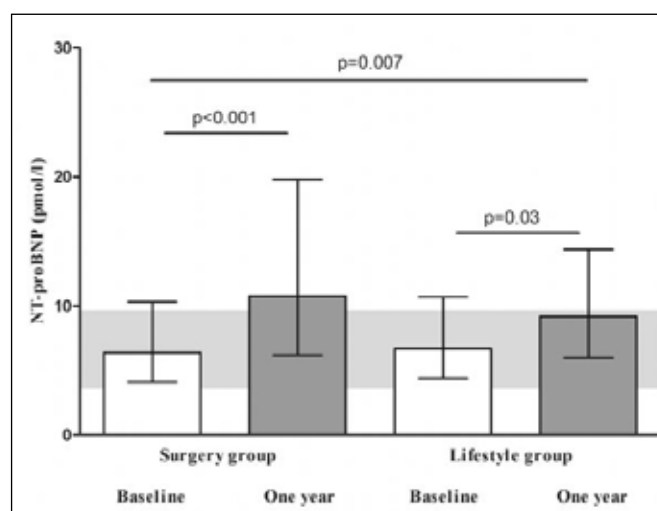


Fig. 1. NT-proBNP-levels before and after both interventions. Median NT-proBNP-levels (25–75 percentiles) at baseline and after gastric bypass surgery and lifestyle intervention. P-values indicate significant changes within and between the intervention groups. The grey background represents the 25–75 percentile for the NT-proBNP levels in the normal weight healthy reference group.

Revisional surgery for insufficient weight loss after Roux-en-Y gastric bypass: Addition of different restrictive and malabsorptive modifications

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Introduction: Weight regain after short limb (SL) or very very long limb (VVLL) gastric bypass is a well-known problem with an incidence of up to 20% with increasing need for revisional surgery to achieve further weight loss. This study evaluates different restrictive, malabsorptive or combined procedures for failed RYGB.

Methods: A retrospective analysis from a prospectively collected database of all patients undergoing revisional surgery for failed RYGB has been conducted. Prerevisional Excess Weight loss (EWL), types of revisional procedures and additional weight loss were reviewed.

Results: 51 patients (11 male, 40 female, mean age of 43.9 years) undergoing revisional surgery after RYGB were identified. Mean initial BMI was 48.5 kg/m², EWL achieved before the revisional procedure was 26.2%. Types of revisional procedures were: a) gastric pouch resizing (n = 7) b) gastric pouch banding (n = 12) c) restrictive and common channel modifications (n = 7) d) lengthening of the biliopancreatic limb (n = 25). EWL was a) 27.4% at 12 and 21.9% at 24 months, b) 55.1% at 12 months, c) 25.6% at 12 and 22.8% at 24 months, d) 51.5% at 12, 51.3% at 24, 58.6% at 36 months of follow up (FU). 3 patients with FU >60 months showed stable EWL of 58.6%.

Conclusion: Biliopancreatic limb lengthening represents the key method for additional weight loss but with the risk of potential severe malnutrition (12%) demanding parenteral nutrition or needed restoration to short limb RYGB (8%). Rigorous selection and close follow up are needed for this patient group. Pouch resizing and/or common channel shortening showed poor additional weight loss.

Results: for pouch banding are promising, but longterm data must be awaited.

Type 2 Diabetes, Obesity and Laparoscopic Sleeve Gastrectomy: Long-term follow up, review of the criteria for diabetes remission and relationship with weight 'regain'

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Background: Sleeve Gastrectomy (SG) has demonstrated to be effective for weight loss and glucose control in obese and diabetic patients, over a short follow-up time. Actually, data on long term follow up after this bariatric procedure are missing. AIIMS to evaluate the long-term effects of SG on obesity and Type 2 Diabetes (T2D) 7 years after surgery, re-evaluate the criteria for T2DM remission, study the incidence of weight regain and his relationship with T2DM.

Methods: 195 obese patients (43M) aged 43.9 ± 10.6 years, 78 with T2DM, underwent SG and followed for 7 years. The patients in complete remission from T2DM (fasting blood glucose FBG < 100 mg/dl and HbA1c < 6%) and partial remission (FBG < 110 mg/dl and HbA1c < 6.5%) according to international guidelines underwent Oral Glucose Tolerance Test (2h OGTT with BG determination every 30'). Regain was defined as weight recovered (in%) after reaching the minimum weight.

Results: before surgery body weight and BMI were 123 ± 21 Kg and 44.6 ± 6.8 Kg/m² respectively; seven years after surgery 104.9 ± 18 Kg and 37 ± 6 Kg/m². Minimum weight and BMI (79.2 ± 16.1 Kg, BMI 28.6 ± 5.3 Kg/m²) were reached after two years, when a modest regain ($22 \pm 6.7\%$) started in 47% of patients operated. The highest incidence of weight regain occurred in patients with T2D before SG (52% of patients with diabetes vs 37% of non-diabetics). The T2D resolution was similar between the group without regain (56%) and the regain group (60%); no recurrence of T2D in no regain group, one in regain group; no new diagnosis of T2D. Partial and complete resolution of T2D according to guidelines was observed in 72% (56/78) of patients. However, using OGTT only 40% had normal glycaemic curve, 46% showed alterations (IGT or BG > 200 mg/dl at the intermediate times) and 14% showed overt diabetes. All patients with abnormal OGTT had HbA1c > 5.5%.

Conclusions: SG leads to weight loss comparable to other bariatric procedures. After 24 months of follow-up less than half of patients has a modest regain, far from returning to preoperative levels, more pronounced in diabetic patients. The resolution of T2D according to international guidelines is not always confirmed by OGTT which is therefore indicated in cured patients with HbA1c > 5.5%.

Gastric bypass specifically alters liver metabolism as compared to sleeve gastrectomy in subjects matched for postoperative weight

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Background: Numerous studies have shown that Roux-en-Y gastric bypass (RYGBP) has a greater effect on glucose metabolism than sleeve gastrectomy (SG), suggesting specific weight-independent mechanisms. However, the importance of such mechanisms with regard to the greater magnitude of weight loss after RYGBP remains debated. Furthermore, few

studies have explored whether other metabolic parameters are specifically modified by RYGBP.

Objectives: To compare changes in metabolic parameters one year after SG and RYGBP in subjects matched for postoperative weight.

Methods: 81 subjects that underwent SG were matched with 81 subjects that underwent RYGBP, for gender (11 men/80 women), age (42 ± 11 vs. 43 ± 10 yr) and 1-year postoperative weight (87.8 ± 17.2 vs. 87.5 ± 17.2 kg). Metabolic parameters were prospectively recorded before and 1 year after surgery.

Results: Before surgery, BMI (45.3 ± 5.9 vs. 44.5 ± 7.7 kg/m²) and metabolic parameters were not significantly different between RYGBP and SG candidates. After surgery, metabolic parameters improved in both groups. However, although postoperative BMI was similar (32.8 ± 5.8 vs. 32.3 ± 6.5 kg/m²), C-reactive protein (2.87 ± 2.78 vs. 3.97 ± 3.05 mg/l, $p = 0.021$), ferritin (71 ± 60 vs. 116 ± 101 µg/l, $p = 0.001$) and LDL-cholesterol (2.65 ± 0.71 vs. 3.33 ± 0.99 mmol/l, $p < 0.001$) were lower in RYGBP as compared to SG, whereas alkaline phosphatase (90.3 ± 28.8 vs. 73.8 ± 22.5 UI/l, $p < 0.001$) and transaminases (ASAT 21.1 ± 8.3 vs. 18.2 ± 7.4 UI/l, $p = 0.020$ and ASAT 28.9 ± 13.6 vs. 21.0 ± 6.6 , $p < 0.001$) were higher. In contrast, the parameters of metabolic syndrome (including blood pressure, fasting blood glucose, triglycerides and HDL-cholesterol) and insulin resistance (fasting serum insulin and HOMA-IR index) were not different in the 2 groups after surgery.

Conclusion: When matched for 1-year postoperative weight, the parameters of metabolic syndrome improved to the same extent after SG and RYGBP. In contrast, RYGBP induces specific effects on liver metabolism, independently of weight loss. Further studies are required to explain these differences between both surgical techniques.

Serum lipidomics reveals greater early suppression of circulating very-long chain ceramides in gastric bypass compared to gastric banding

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Background & Aims: Circulating phospholipids (PL) and sphingolipids (SL) are elevated in diabetes and nonalcoholic steatohepatitis, yet the effect of bariatric surgery on these lipids is poorly understood.

Objectives: We aimed to determine how circulating PL and SL changed following gastric banding (Banding) and roux-en-Y gastric bypass (RYGB) in the first 3 months.

Material/Methods: Fasting serum was collected from 58 obese women (BMI range 37–51; 39 RYGB) before surgery, then at 1 (n = 33; 21 RYGB) and 3 months (n = 33; 22 RYGB). HPLC-MS/MS was used to quantify 134 lipids from 7 PL and 4 SL sub-classes. DEXA measurements and routine laboratory parameters were also obtained.

Results: At baseline, Ceramides, sphingomyelins, and phosphatidylcholines were positively correlated with total cholesterol, LDL-C, and ApoB (Rho = 0.44 to 0.75), whereas phosphatidylethanolamine, phosphatidylglycerol, and phosphatidylinositol were positively associated with serum triglycerides (rho = 0.42 to 0.48), false discovery rate (FDR) < 5%. After surgery, both Banding and RYGB rapidly induced weight loss and reduced markers of inflammation (CRP, IL-6, neutrophils) and insulin resistance (HOMA-IR), with RYGB producing more rapid or greater improvements in fat mass, and serum total cholesterol, LDL-C, and adiponectin ($P < 0.05$). Strikingly, 83 lipids were decreased after surgery, ranging from 20% to 80% suppression, with PC-38:3, PC-34:3, PE-38:3, and Cer-23:0 among the most reduced. 27 lipids were altered differentially by RYGB; several PC species (PC-38:3, -36:2, -34:0) decreased to a greater extent in RYGB, while ceramides and dihydroceramides (-22:0, -23:0, -24:0, -25:0)

and sphingomyelins returned to baseline in Banding, but maintained suppression to 25% of baseline concentrations in RYGB (Figure 1). The ceramides and sphingomyelins most suppressed by RYGB were longitudinally associated with the decrease in total cholesterol and LDL-C.

Conclusion: As circulating very-long chain ceramides are thought to be synthesized and secreted by the liver to induce insulin resistance in obesity, our findings are consistent with a hypothesis whereby RYGB rapidly reduces peripheral insulin resistance partly by decreasing liver-derived ceramides.

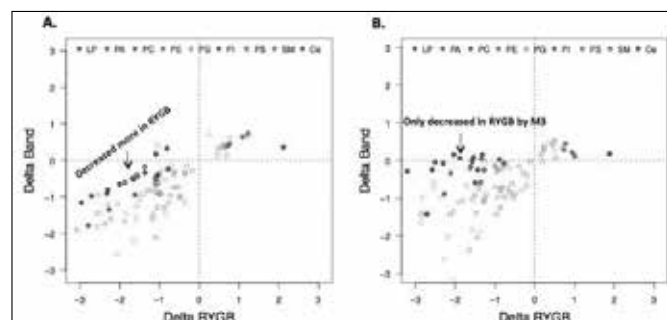


Fig. 1. Change in phospho/sphingolipids by time and surgery.

Change in the geometric mean of each lipid between baseline and month 1 (A) and month 3 (B). Unfilled circles reflect lipids that changed regardless of surgery type (main effect of time) and filled circles are lipids that had a surgery-type by time interaction (2-way ANOVA; false discovery rate <5% main-effect and <10% interaction). Axes are on the log-2 scale i.e. -1 = 50% decrease. Band = Gastric banding, RYGB = Roux-en-Y Gastric Bypass, LP = Lysophospho-choline and -ethanolamine, PA=Phosphatidic acid, PC = Phosphatidylcholine, PE = Phosphatidylethanolamine, PG = Phosphatidylglycerol, PI = Phosphatidylinositol, PS = Phosphatidylserine, SM = Sphingomyelin, Ce = Ceramides and dihydroceramides.

Acknowledgements: This study was financed by APHP program MicroBaria "AOM10285/ P100111", and registered as clinical trial NCT01454232.

PP5.10

Predictors of secondary hyperparathyroidism after bariatric surgery in patients with vitamin D deficiency

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Background/Aims: Obesity is a risk factor for vitamin D deficiency. Vitamin D deficiency can lead to secondary hyperthyroidism (SHPT) but not all patients with this vitamin deficiency develop SHPT. The reason to this is not well known.

Objectives: To study predictors of SHPT in morbidly obese patients with vitamin D deficiency submitted to bariatric surgery.

Material/Methods: Case-control study of patients submitted to bariatric surgery. We excluded patients without vitamin D deficiency and glomerular filtration rate (GFR) <45mL/min. Vitamin D deficiency was defined as vitamin D ≤30ng/dL and SHPT as vitamin D ≤30ng/dL and PTH >65pg/mL. Cases: patients with SHPT; controls: patients with vitamin D deficiency, but without SHPT. Cases and controls were matched 1:1 by calcium (±0.1mg/dL) and vitamin D (±2ng/mL) levels 1 year after bariatric surgery. Cases and controls were compared. We built a multivariate logistic regression model to study predictors of SHPT; variables included in the model were age, sex, GFR, body mass index, alkaline phosphatase (AlkP), initial calcium and phosphate and bariatric surgery type.

Results: We studied 57 patients' pairs. Mean: 43 ± 10 years; 13.2% were men. There were no differences in patients' characteristics between patients with and without SHPT except AlkP which was higher in those with SHPT: 81 ± 20 vs. 69 ± 17, p = 0.003. In the multivariate analysis, only AlkP and initial phosphate were independent predictors of SHPT.

Per each 10U/L increase in AlkP levels the odds ratio of SHPT 1 year after bariatric surgery was: 1.45 (CI 95% 1.11–1.90), p = 0.006 and per each 1mg/dL increase in phosphate levels the odds ratio was: 0.30 (CI 95% 0.12–0.75), p = 0.01.

Conclusions: Age, sex, bariatric surgery type and GFR did not predicted SHPT after bariatric surgery. The only independent predictors of SHPT in vitamin D deficient patients were initial AlkP and phosphate levels. Per each 10U/L increase in AlkP levels the risk of SHPT was increased by 45% and per each 1mg/dL increase in phosphate levels the risk was decreased by 70%.

PP5.11

Increased bone resorption following gastric bypass surgery is related to the procedure itself, weight loss and changes in secreted Wnt antagonists

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Background & Aims: The mechanisms for bone loss following bariatric surgery are not fully clarified but are associated with enhanced bone turnover.

Objectives: To reveal insight into if the skeletal changes after bariatric surgery are related to metabolic consequences of the surgical procedure or weight loss per se.

Material/Methods: Study participants were part of a one-year, controlled clinical trial comparing the effect of Roux-en-Y gastric bypass (RYGB) surgery with lifestyle intervention on obesity-related comorbidities. One-hundred and thirty seven patients (surgery = 74, lifestyle intervention = 63) had paired blood samples available for serum analysis of markers reflecting bone turnover, Wnt antagonism, calcium homeostasis, the somatotrophic axis and inflammation in addition to detailed information on weight loss, physical activity and vitamin D supplementation. Participants in the surgery group were significantly younger [mean (SD) 42.8 (10.5) years versus 47.0 (11.0) years, p = 0.033] and had a higher BMI [46.7 (5.7) kg/m² vs. 43.3 (5.0) kg/m², p < 0.001] at baseline than the patients in the lifestyle group. There were no gender differences (70% female in both groups).

Results: Surgically treated patients experienced a significantly greater weight loss than their conservatively treated counterparts (30.0% versus 8.4%, p < 0.001). All measures of bone turnover in serum [N-terminal telopeptide (NTx), osteocalcin (OCN) and procollagen type I N-terminal propeptide (P1NP)] increased markedly after surgery reaching levels well above those in the lifestyle group. In the group as a whole, the changes in NTx, OCN and P1NP were strongly correlated with change in BMI (r = -0.73, r = -0.49 and r = -0.68, respectively, all p < 0.001). There were no group interactions. Change in the bone resorption marker NTx was positively correlated with changes in the secreted Wnt antagonists dickkopf-1 (DKK1) and sclerostin (SOST). Stepwise linear regression revealed significant effects of both group and weight change for change in NTx. Further, change in DKK1 and SOST remained independent predictors of change in NTx.

Conclusion: Our data support that weight loss itself is not the only underlying mechanism for bone loss following bariatric surgery, but that mechanisms related to the procedure itself and changes in secreted Wnt antagonists may contribute to increased bone turnover.

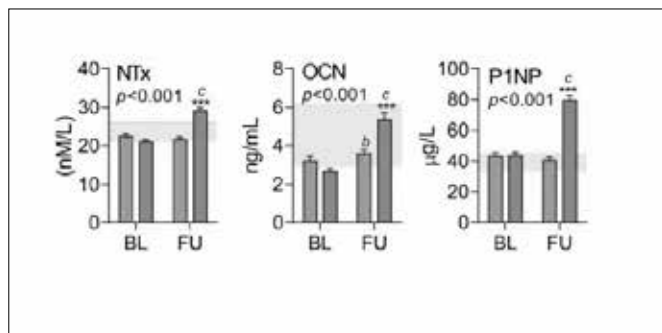


Fig. 1. Serum measures of bone turnover before and after both interventions. Serum levels of N-terminal peptide (NTx), osteocalcin (OCN) and procollagen type 1 N-terminal propeptide (P1NP) at baseline (BL) and follow-up (FU, 1 year) in morbidly obese patients treated with either gastric bypass or lifestyle intervention. P-value indicated treatment*time effect from repeated measures ANOVA. ***p < 0.001 vs. lifestyle same timepoint. bp < 0.01, cp < 0.001 vs. baseline. The green background represents the 25–75 percentile for the levels in a normal weight healthy reference group. Data are given as mean ± SEM.

PP5.12

Cardiac fitness improvement after RYGB

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The therapeutic target in obesity is not only body weight but also there are cardiovascular comorbidities including hypertension and coronary heart disease. After bariatric surgery there is an improvement in body weight, metabolic parameters, blood pressure and cardiometabolic fitness.

Material/Methods: we performed ergospirometry (Shiller CS-200, Bruce protocol) in 50 obese patients before and six months after Roux-en Y gastric bypass (RYGB). Baseline characteristics: females n = 37, males n = 13, average BMI 43.8 kg/m². We have analyzed changes in pulse rate, systolic blood pressure (SBP) in rest and maximal SBP, diastolic blood pressure (DBP) and maximal DBP, ventilatory anaerobic threshold (VAT/VO₂) and peak in oxygen consumption (VO₂). VO₂ less than 14 ml/kg/min was exclusion criteria for bariatric surgery

Results: there was significant change in pulse rate (98,7 ± 12,2 vs. 88,01 ± 13,46/min; <0,0001), SBP in rest (135 ± 14 vs. 131 ± 13 mmHg; 0,017), max SBP (181 ± 26 vs. 162 ± 22 mmHg; <0,0001), DBP in rest (85 ± 8 vs. 80 ± 9 mmHg; <0,0001), max DBP (98 ± 12 vs. 92 ± 10 mmHg; 0,002). Also, there was improvement in VAT/VO₂ (17,8 ± 3,44 vs. 20,86 ± 4,70 ml/kg/min; <0,0001) and in peak VO₂ (20,79 ± 3,63 vs. 24,97 ± 4,37 ml/kg/min; <0,0001).

Conclusion: These results suggest that bariatric surgery improves a peak in oxygen consumption and ventilatory anaerobic threshold as well as pulse rate and blood pressure parameters and that could be explanation for cardiometabolic fitness improvement.

Table 1. Cardial fitness parameters before and six months after RYGB

Parameter	Before RYGB	Six months after RYGB	p
P in rest /min	98,7 ± 12,2	88,01 ± 13,46	<0,0001
Max P /min	179 ± 8	160 ± 17	NS

SBP in rest (mmHg)	135 ± 14	131 ± 13	0,017
Max SBP (mmHg)	181 ± 26	162 ± 22	<0,0001
DBP in rest (mmHg)	85 ± 8	80 ± 9	<0,0001
Max DBP (mmHg)	98 ± 12	92 ± 10	0,002
VAT/VO ₂ (ml/kg/min)	17,8 ± 3,44	20,86 ± 4,70	<0,0001
PeakVO ₂ (ml/kg/min)	20,79 ± 3,63	24,97 ± 4,37	<0,0001

PP5.13

Food craving and weight loss: An integrated analysis of the effects of prolonged-release naltrexone/bupropion on the cravings and mood sub-scales of the Control of Eating Questionnaire

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Prolonged release naltrexone/bupropion (NB) is postulated to act in the hypothalamus and CNS reward pathways to elicit weight loss. In four phase 3 trials, the Control of Eating Questionnaire (CoEQ) was used to assess food cravings and mood over the previous 7 days. The effect of NB on CoEQ components, and the relationship with weight loss, was evaluated. An integrated post-hoc analysis of CoEQ data from four 56-week phase 3 trials of NB in overweight or obese subjects was performed. CoEQ was administered at baseline and Weeks 8, 16, 28, and 56. Analysis was performed on subjects who completed 56 weeks of NB (n = 1238) or Placebo (PBO; n = 720), and had weight and CoEQ measurements at baseline and Week 56. A principal components analysis of the CoEQ revealed 4 components explaining 67.3% of total variance: Craving Control (CR); Craving for Sweet (SW); Craving for Savory (SV); and Positive Mood (MD). Treatment differences were evaluated using ANOVAs and associations between CoEQ components and weight loss were examined using Pearson's correlations. NB significantly improved CR (p < 0.001), SW (p < 0.02), SV (p < 0.001), and MD (p < 0.001) compared with PBO. Early improvements in CR (Week 8, 16, and 28) and SW (Week 8) with NB vs PBO were independent of weight loss. The largest treatment effect was observed with CR, and CR improvement at each time point was associated with Week 56 weight loss (p < 0.001). In the subset of subjects with body composition measurements (n = 67), early CR improvement (Week 8) was associated with greater reduction in fat mass (r = -0.39; p < 0.001) and BMI (r = -0.40; p < 0.001) at Week 56. Compared with PBO, NB resulted in improved CR and SW independent of weight loss, suggesting a direct effect of NB on cravings. Further, NB was associated with sustained improvement in all CoEQ sub-scales, and improvements in CR were associated with reductions in fat mass and BMI at Week 56.

PP5.14

Efficacy of naltrexone/bupropion, administered as recommended in clinical practice, compared with usual care for weight management

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Prolonged-release naltrexone 32 mg/bupropion 360 mg (NB) is approved in the US and EU for chronic weight management as an adjunct to a reduced-calorie diet and increased physical activity in overweight/obese adults with an initial body mass index (BMI) of ≥30 kg/m² or ≥27 kg/m²

in the presence of at least one weight-related comorbidity. Phase 3 studies demonstrated significantly greater weight loss with NB vs. placebo in the setting of both standard and intensive lifestyle modification counseling. The current study examined the effects of NB combined with a commercially-available telephone/web-based lifestyle intervention program, compared with usual care (UC; periodic diet and exercise advice), in overweight/obese subjects. To continue NB treatment subjects were required to exhibit $\geq 5\%$ weight loss after 16 weeks (consistent with NB prescribing information), with no sustained increase in blood pressure. Analyses were performed on subjects who remained on treatment through Week 26 (per protocol [PP] population), and on subjects with ≥ 1 post-baseline visit (modified intent-to-treat [mITT] population) using mixed-model repeated measures. The primary endpoint was change in weight at Week 26 in PP subjects. The randomized population (NB, $N = 153$; UC, $N = 89$) was 84% female, 78% white, with mean (SD) baseline age of 47 y (9.8) and BMI of 36.3 (4.3) kg/m^2 . The mITT population consisted of NB $n = 152$ and UC $n = 88$, and the PP population consisted of NB $n = 71$ and UC $n = 82$. The primary reasons for NB discontinuation were adverse events ($n = 35$) and not meeting the Week 16 criteria ($n = 32$). At 26 weeks, PP NB subjects exhibited 8.5% greater least squares mean [SE] weight change compared with UC subjects (-9.5 [0.5]% vs. -0.9 [0.5]%; $p < 0.001$, respectively). Weight change in mITT subjects, which included subjects discontinued from treatment, was NB: -6.2% (0.5) vs. UC: -1.1% (0.6) ($p < 0.001$). More patients with NB vs. UC achieved 5%, 10%, and 15% weight loss. The adverse event profile was similar to phase 3 trials. In this study NB, when combined with lifestyle modification and used as recommended in clinical practice (i.e., $\geq 5\%$ loss at week 16), resulted in nearly a 10% mean weight loss at 26 weeks.

PP5.15

Gender differences in the prevalence of malnutrition in patients with morbid obesity

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Introduction: Vitamin deficiency is a well-known phenomenon after bariatric surgery, and frequently even preoperatively, especially concerning vitamin D. Since men and women decide to undergo bariatric surgery for different reasons, potential gender differences in preoperative vitamin deficiencies are of special interest.

Methods: 1732 patients with morbid obesity wishing to undergo bariatric surgery (77.2% women, age 40 ± 12 years, mean BMI: $44 \pm 9 \text{ kg/m}^2$; 22.8% men, age: 40 ± 12 years, mean BMI: $46 \pm 9 \text{ kg/m}^2$) were analyzed in this cross sectional study. Weight and cardiovascular risk factors as well as ferritin, vitamin B12, folic acid, 25hydroxy (OH) vitamin D, vitamin A and vitamin E were evaluated. Deficits were defined as follows: folic acid $< 5.3 \text{ ng/ml}$, vitamin D-25OH $< 75 \text{ nmol/l}$, ferritin $< 15 \mu\text{g/l}$, vitamin B12 $< 188 \text{ pg/ml}$, vitamin A $< 1.05 \mu\text{mol/l}$, vitamin E $< 11.6 \mu\text{mol/l}$. All patients underwent dietary counseling and substitution of the respective deficits as appropriate.

Results: 63.2% of the women (w) and 63.5% of the men (m) exhibited a deficit in folic acid, and 97.1% (m) vs. 97.6% (w) in vitamin D. 3.8% (m) vs. 5.5% (w) showed a deficit in vitamin B 12 before surgery. 17 men (4.3%) and 95 women (7.1%) had a deficit in vitamin A. There were no significant gender differences except for ferritin (11.8% in women and 1.5% in men ($p < 0.001$)). None of our patients had a deficit in vitamin E.

Discussion: Our data show a very high prevalence of pre-operative malnutrition in morbid obese patients. There were astonishingly no gender-related differences in vitamin B12, D, A and E as well as folic acid. However, women had significantly more often a deficit in ferritin. This study highlights the importance of evaluation and adequate substitution before bariatric surgery.

POSTERS

Wednesday, 1 / Thursday, 2 June, 2016

PO 1 – Basic Science and Experimental Approaches I

PO1.001

Gastric plication improves glycemia by restoring the altered expression of aquaglyceroporins in adipose tissue and liver in diet-induced obese rats

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Introduction: Gastric plication represents a minimally invasive bariatric surgical procedure used for the improvement of obesity and its related comorbidities.

Objective: the main goal of the study was to evaluate the effectiveness of gastric plication on the resolution of obesity, impaired glucose tolerance and fatty liver in an experimental model of diet-induced obesity (DIO) as well as to evaluate plausible changes in glycerol metabolism, a key substrate for adiposity and gluconeogenesis, in adipose tissue and liver.

Methods: Male Wistar DIO rats (n = 58) were subjected to surgical (sham operation or gastric plication) or dietary interventions [fed ad libitum a normal diet or a high-fat diet or pair-fed to the amount of food eaten by gastric-plicated animals]. The expression of aquaglyceroporins (AQPs) in metabolically active tissues, such as epididymal (EWAT) and subcutaneous (SCWAT) fat and liver were analyzed by real-time PCR and Western-blot.

Results: Gastric plication did not result in a significant weight loss in DIO rats, showing a modest reduction in whole-body adiposity and hepatic steatosis. However, animals undergoing bariatric surgery exhibited an improvement in basal glycemia and glucose clearance (both $P < 0.001$), without changes in hepatic gluconeogenic genes. DIO was associated with an increase in serum glycerol, protein levels of AQP3 and AQP7 in EWAT and SCWAT, respectively, and a decrease in hepatic AQP9. Gastric plication down-regulated ($P < 0.05$) AQP3 in both fat depots, without changes in AQP7 and hepatic AQP9. A negative correlation was found between Aqp3 mRNA with total white adiposity and adipo-IR index in EWAT.

Conclusions: We herein show that gastric plication results in a very modest reduction in the lipid accumulation of adipose tissue and liver, but restores glycemia by down-regulating AQP3, which entails lower efflux of glycerol from fat, lower plasma glycerol availability and, hence, a reduced use of glycerol as a substrate for hepatic gluconeogenesis.

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: This work was supported by FIS-FEDER (FIS PI12/00515 and PI13/01430), the Department of Health of Gobierno de Navarra (61/2014) and project PIUNA 2011–14. CIBEROBN is an initiative of the Instituto de Salud Carlos III, Spain.

PO1.002

Effects of butyrate starch on glucose tolerance and GLP-1 secretion in Goto-Kakizaki rats

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Multiple evidence indicates that changes of gut microbiota affect metabolism and are associated with diseases (i.e. type 2 diabetes) and obesity. Colonic fermentation by microbiota of non-digestible carbohydrate results in the production of short chain fatty acids (SCFA) such as butyrate. These bioactive molecules are suggested to beneficially affect insulin sensitivity and diet-induced obesity. Based on this potential benefit of butyrate on insulin sensitivity, we investigated whether butyrate resistant starch (B-RS) which delivers high amount of butyrate in a colonic area, might improve the glucose homeostasis in prediabetic Goto-Kakizaki (GK) rats. Seven-week old GK rats were fed for 10 weeks either a control diet or diets containing 10% resistant starch (RS), or 10% B-RS. An oral glucose tolerance test (OGTT) was performed at week 8 and blood and caecum were collected at 10th week in rats after an overnight fasting (n = 10/group) or 2-hour refeeding (n = 10/group). B-RS administration increased caecum acetate, propionate and butyrate levels as compared to control and RS diets when measured at refeeding conditions. Postprandial portal plasma butyrate concentration was also significantly higher in B-RS group as compared to the 2 other groups. At sacrifice, fasting glycaemia was lower in B-RS when compared to RS group (6.2 ± 0.2 vs. 7.1 ± 0.3 mM, $P < 0.05$, respectively), however this did not translate to any difference in OGTT outcomes. In addition, the treatment increased portal vein GLP-1 concentration at a refeeding phase (B-RS; 18.5 ± 4.1 , Control; 10.5 ± 1.8 , RS; 10.0 ± 2.9 pg/ml, $P < 0.05$). This increase in GLP-1 possibly affected the beta cell function as shown by the improvement of HOMA-B% when compared to RS group (28% higher in B-RS). Finally body weight and composition were not different between three groups. In conclusion, B-RS feeding improved fasting glycaemia and beta cell function probably and partly via increased GLP-1 secretion. These effects on GLP-1 secretion and beta-cell function via B-RS require further investigations to understand underlying mechanisms.

PO1.003

Dietary normalization one month before pregnancy in diet-induced obese rats improves the response to an obesogenic environment in the adult male offspring

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Aim: To study whether the adverse effects expected in the offspring associated with maternal dietary obesity can be reversed with the removal of the obesogenic diet in mothers before pregnancy.

Methods: Female rats were fed a cafeteria diet from days 10 to 100 of age. A parallel control group of female rats fed a standard diet (SD) was also followed. One month before pregnancy, the cafeteria diet was replaced with a SD (postcafeteria model), and females from control and postcafeteria groups were mated with males. At weaning, offspring of control and

postcafeteria dams were fed a SD until 4-months of age, and then with SD or western diet until 6-months of age.

Results: The offspring of postcafeteria dams, both males and females, presented lower food intake, lower weight gain and lower percentage of body fat when exposed to an obesogenic diet, compared to the offspring of control dams. After 2 months of exposure to western diet, male offspring of postcafeteria dams showed in retroperitoneal white adipose tissue a decrease in the expression of lipogenic genes (Pparg, Srebf1, Fasn), and of Pnpla2, Cpt1b, Insr, Lep and Mest, which was not observed in the offspring of control dams. They also exhibited a lower activation of the hepatic expression of lipogenic-related genes (Srebf1, Fasn, Scd1) under western diet, along with a lower lipid accumulation in this tissue compared to the offspring of control dams. In the hypothalamus, the male offspring of postcafeteria dams showed a lower expression of the orexigenic neuropeptide Npy, which may explain the lower intake observed in these animals in comparison to their controls.

Conclusion: There is a phenomenon of metabolic programming associated to dietary normalization before pregnancy in diet-induced obese rats, which seems to generate a protective effect in the adult offspring, particularly males, against an excess of weight gain and fat accumulation, hyperphagia, and hepatic lipid accumulation even after exposure to an obesogenic environment.

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PO1.004

The relationship between insulin resistance and pulmonary function in overweight or obese US adults with asthma

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Background: Obesity is recognized as a risk factor for both asthma and insulin resistance in adults. Also, insulin resistance and the resultant metabolic disturbances influence lung function in the general population. Recently, increased levels of central and peripheral insulin has been suggested as a possible pathophysiologic link between obesity and asthma.

Objective: To examine the association between obesity, insulin resistance and pulmonary function in US adults with asthma.

Methods: This cross-sectional study was performed on a sample of 1276 asthmatic adults, extracted from 2009–2012 NHANES database. Spearman correlation and multivariate linear regression were used to evaluate the relationships between obesity measures, insulin sensitivity/resistance indicators and spirometric parameters of pulmonary function in asthmatic adults.

Results: Adiposity (measured by BMI, waist circumference (WC) and waist to height ratio (WHtR)) was inversely related to forced expiratory volume in 1 second (FEV1) ($r = -0.24, -0.21$, and -0.40 , respectively $p < 0.001$) and forced vital capacity (FVC) ($r = -0.23, -0.17$, and -0.39 , respectively, $p < 0.001$). HOMA-IR showed significant negative correlation with FEV1 ($r = -0.14, p < 0.001$) and forced vital capacity (FVC) ($r = -0.16, p < 0.001$). Additionally, forced expiratory flow (FEF) 25–75% was significantly lower in participants at higher levels of abdominal obesity ($p < 0.001$). Centrally obese men with asthma also had significantly lower FEV1/FVC ratios ($p < 0.001$). WHtR was the strongest anthropometric correlate of decreased lung function in both sexes. The obesity-FEV1 relationship was more prominent in females while the obesity-FVC relationship was more pronounced in males. BMI and HOMA-IR predicted approximately 8 and 6% of the variances in FEV1, respectively. Also, 8 and 7% of FVC variability in asthmatic adults was explained by these factors. Further, insulin resistance modified the effects of BMI, WC and WHtR on FEV1 ($\beta = -0.11, -0.09$, and -0.09 , respectively) and FVC ($\beta = -0.10, -0.09$, and -0.11 , respectively).

Conclusion: Insulin resistance predicts impaired lung function in overweight/obese asthmatic adults independent of adiposity, age, gender,

height, and smoking status. It also modifies the effect of obesity on respiratory performance in adults with asthma.

PO1.005

Defining the role of gamma synuclein in the regulation of adipocyte lipid metabolism

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Background: Synucleins are a family of proteins principally known for their involvement in neurodegenerative disease. Gamma (γ)-synuclein is highly expressed in human white adipose tissue and increased in obesity (1). We have previously shown that loss of γ -synuclein significantly protects mice from high-fat diet (HFD)-induced obesity and associated metabolic complications. HFD-fed γ -synuclein-null mutant mice display increased lipolysis, lipid oxidation, and energy expenditure, and reduced adipocyte hypertrophy (2). However, the mechanisms whereby γ -synuclein is increased during obesity and influences lipid oxidation and energy expenditure remain unknown (3).

Objectives: Our study Aims: to: (i) identify which nutrients in an obesogenic diet increase γ -synuclein mRNA expression and how this occurs; (ii) define how γ -synuclein can regulate lipid oxidation and energy expenditure in adipocytes.

Methods: We have examined the effects of altering γ -synuclein expression in 3T3-L1 adipocytes, by overexpression or siRNA mediated knockdown. Expression of γ -synuclein and genes controlling adipocyte metabolic function were determined by qPCR and metabolic flux analysed using a Seahorse Bioanalyser.

Results: We demonstrate that specific lipid species can differentially induce γ -synuclein mRNA expression in adipocytes. Furthermore, overexpression of γ -synuclein in adipocytes reduces UCP1 mRNA expression. Finally, altering the expression of γ -synuclein in adipocytes may influence their lipid oxidation capacity.

Conclusion: This is the first demonstration that γ -synuclein can alter UCP1 expression and adipocyte lipid oxidation in a cell-autonomous manner. These data demonstrate that γ -synuclein levels in adipocytes could alter the capacity of adipose tissue to oxidise lipids and so influence metabolic health. As such it may offer an exciting potential target for altering adipose tissue function to improve obesity related metabolic disease.

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PO1.006

Diet-induced Obesity and in Utero High-fat Diet Exposure Alter Paraventricular Hypothalamic Epigenomes

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The rate of obesity is growing worldwide, which is causing an increased health burden. Identifying individuals who may be at high risk of becoming obese can help target early health promotion. Many neuroendocrine pathways control glucose metabolism, with the paraventricular nucleus of the hypothalamus (PVH) being a key coordinator. Maternal diet during pregnancy has long-term consequences for the metabolic health of the offspring. However, mechanisms underpinning these diet-mediated and trans-generational effects remain only partly understood. Here we aim to identify whether and how diet-induced obesity and in utero high-fat

diet exposure might alter the PVH epigenome. Mice were fed a high-fat, high-sugar or control diet for 15 weeks and diet-induced obesity with type 2 diabetes was confirmed in the high-fat diet group. The mice were then culled after either being fed normally or fasted in the preceding 16 hours. In addition, mice of a normal body weight were randomised to a high-fat diet or normal diet during pregnancy, and the offspring were culled at 8 weeks of age. The PVH was microdissected for both experiments and samples were then prepared for ChIP-seq, specifically investigating H3K4me3, an epigenetic change in the chromatin known to be transcriptionally up-regulating. Analysis of the data generated from next generation sequencing used pipelines, including Segemehl for mapping, Macs2 for peak calling and BedTools and custom python scripts for annotation analysis. The reliability of the data was confirmed with IDR (Irreproducible Discovery Rate). To identify cellular processes that may be altered by diet, the ChIP Seq data was fed into gene ontology. Interestingly, we noticed a particular up-regulation of pathways involved in the molecular processes of synaptic transmission, in particular synaptic vesicle recycling, in the HFD fast group. It appears diet-induced obesity effects the neurological response to fasting. We are in the process of verifying this data using candidate qPCR. In summary, we have established a novel method to analyse changes in the epigenome of hypothalamic sub-areas using ChIP-Seq and subsequent bioinformatic data analysis. We found that the PVH epigenome is significantly altered by diet-induced obesity, suggesting significant alterations to synaptic vesicle recycling.

PO1.007

A possible link between gut microbiota and hepatic oxidative stress, inflammation and glucose intolerance induced by high fructose diet

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Background and Aims: By using an animal model represented by adult rats we have previously shown that obesity and insulin resistance are elicited by long term feeding a low-fat, fructose-rich, diet; when fructose is added to a high fat diet, hepatic steatosis increases even after short term consumption. However, fructose administration may also act by altering gut microbiota, since, we have recently shown that fructose-induced metabolic syndrome can partly be reversed by antibiotics or faecal transplantation. Therefore the aim of the present study was to investigate the link between fructose-induced hepatic metabolic derangement and gut microbiota alterations.

Materials and Methods: Adult rats fed a fructose-rich diet for 8 weeks were simultaneously treated with an antibiotic mixture. Data of body composition, glucose homeostasis and plasma inflammatory parameters, together with function and oxidative status of hepatic mitochondria, were compared with values obtained from rats fed fructose-rich diet only. Changes in caecal microbiota composition were also assessed.

Results: Development of obesity by fructose-rich diet was not affected by antibiotic treatment. Decreased insulin sensitivity was induced by fructose-rich diet, and was partly reversed by antibiotic treatment, which also abolished the fructose-induced increase in plasma triglycerides, transaminases and peroxidized lipids, as well as in portal concentrations of TNF- α and LPS. Hepatic triglycerides, lipid peroxidation and SCD-1 activity that were significantly higher in fructose-fed rats and were not affected by antibiotic treatment. However antibiotic treatment reversed the increase in mitochondrial efficiency and oxidative damage to mitochondrial lipids and proteins, found in fructose-fed rats, and reversed the decrease in the activity of antioxidant enzyme superoxide dismutase. The number of members of three genera, Coprococcus, Ruminococcus, and Clostridium and of the Clostridiaceae family, was significantly affected by fructose-rich diet, and restored by antibiotic treatments.

Conclusions: The results indicate that, when gut microbiota modifications induced by dietary fructose are overcome by antibiotic administration, inflammatory parameters and glucose intolerance can be reversed

fully or partly, respectively, although the development of obesity is not affected at all.

PO1.008

Association of FTO and apelin gene expression with dietary intake of fat and oil among morbid obese and non-obese subjects

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Background & Aim: Recently, fat mass- and obesity-associated (FTO) was identified as a candidate gene contributing to both childhood and severe adult obesity. Furthermore, apelin is an adipokine which plays a role in the obesity related metabolic disorders. While the effect of dietary intake on apelin and FTO gene expression has been assessed in a number of animal studies, data in human was rare. The objective of the present study was to investigate the association between the apelin and FTO gene expression in adipose tissue and intake of hydrogenated and non-hydrogenated vegetable oils and butter.

Material/Methods: Visceral and subcutaneous adipose tissues were obtained from 32 morbid obese and 32 age- and sex-matched non-obese subjects, who underwent open abdominal surgery with minimal impact on dietary intake. Intake of hydrogenated and non-hydrogenated vegetable oils and butter was collected using a valid and reliable food frequency questionnaire. The gene expressions of apelin and FTO in visceral and subcutaneous adipose tissue were assessed by Real-Time PCR.

Results: Visceral adipose tissue FTO gene expression was correlated with total fat and oil intake ($\beta = 0.792$, $P = 0.017$) among non-obese subjects and, with non-hydrogenated oil ($\beta = -0.413$, $p = 0.043$) among morbid obese subjects. FTO gene expression in subcutaneous adipose tissue was correlated with non-hydrogenated oil ($\beta = -0.506$, $P = 0.032$) among morbid obese subjects. Moreover, we found significant correlations between visceral adipose tissue apelin expression and total fat and oil intake among morbid obese ($\beta = 0.324$, $P = 0.031$) and non-obese ($\beta = 0.380$, $P = 0.027$) subjects. In addition, positive correlation was observed between non-hydrogenated oil and visceral adipose tissue apelin expression among non-obese subjects ($\beta = 0.402$, $P = 0.023$).

Conclusions: Expression of adipose tissue FTO mRNA negatively correlates with non-hydrogenated oil among morbid obese subjects positively correlates with total fat and oil intake. Moreover, non-hydrogenated oil intake positively correlates with apelin gene expression.

Reference:

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Altered lipid partitioning in deficient CBG mice submitted to a hyperlipidic diet

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Background: In humans, corticosteroid-binding globulin (CBG) mutations that decrease its affinity for cortisol trigger subtle abnormalities, the most frequent of which are fatigue, increased sensitivity to pain and hypotension. Overweight or obesity have been reported in some cases of null mutations. In a recent study, a patient showing a normal concentration of CBG but unable to bind to cortisol, shows some features of Cushing syndrome, such as central body fat. Aim Our aim was to evaluate how deficiency in corticosteroid-binding globulin (CBG), the specific carrier of glucocorticoids, affected adipose tissue in obesity.

Material & Methods: Six weeks old male mice (C57BL/6) WT or KO for CBG were submitted during twelve weeks to standard or high fat diet (HF, 60% energy from fat). Corticosterone levels in serum were quantified. The body weight, visceral and subcutaneous WAT weight, adipocyte area were measured. In WAT, CBG immunohistochemistry, western and expressions by RT-PCR were evaluated.

Results: Body weight and food intake were comparable between KO and WT. Total serum corticosterone was reduced and free increased in KO mice compared with WT. In diet-induced obesity, the subcutaneous depot developed less in KO mice compared to WT. This was associated to a minor adipocyte area and PPAR γ expression in KO mice respect WT. Conversely, in CBG deficient mice the epididymal depot displayed higher weight and adipocyte area in KO than in WT mice and a sustained higher PPAR γ expression. Expression of CBG was found in white adipose tissue epididymal and subcutaneous by immunochemistry, real-time PCR and western blot. Whereas under HL diet, CBG mRNA increased in both depots of WT mice, CBG protein content didn't change suggesting a post-translational regulation or a CBG WAT-blood traffic.

Conclusion: CBG deficiency causes an environment high in free glucocorticoids although low in total corticosterone that under a context of lipid excess, drives a lipid partitioning from subcutaneous to visceral adipose tissue without further alterations in food intake or body weight.

Body weight reduction and metabolic profile improvement in obesity-prone rats following sleeve gastrectomy

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Background: The response to dietary fat represents an important factor in the onset of obesity, which is associated with a notable inter-individual variation. Some individuals put on weight very easily (being obesity-prone, OP), while others are not particularly susceptible to obesity but may gain weight if circumstances favour an energy imbalance (non-susceptible to obesity, NSO).

Objective: Our aim was to compare if the well-known positive effects on weight reduction and metabolic improvement of sleeve gastrectomy (SG) are maintained in an experimental model of OP rats.

Methods: Male OP (n = 13) and NSO (n = 14) Wistar rats were submitted to surgical (sham operation and SG) or dietary interventions [pair-fed (PF) to the amount of food eaten by sleeve-gastrectomized rats] after 12 months of being fed a high-fat diet. Body weight and food intake were pe-

riodically registered. Fat pads weight and metabolic profile were analyzed 4 weeks after surgical or dietary interventions.

Results: SG in both OP and NSO rats decreased body weight and adiposity as compared to sham and PF groups (P < 0.05). Total weight loss achieved in sleeve-gastrectomized OP and NSO rats was higher than in PF (P < 0.05), suggesting that the effect of SG is beyond caloric restriction. In this regard, NSO rats exhibited lower weight loss despite showing increased relative food intake and lower food efficiency (P < 0.05), maybe partially due to an increased thermogenesis. An improvement in insulin sensitivity was also observed in OP and OR animals that underwent SG as compared with PF counterparts.

Conclusion: Our findings provide evidence, for the first time, of the beneficial effects of bariatric surgery even in animals with a high obesity susceptibility. 1. Conflict of Interest The authors have nothing to disclose. 2. Funding This work was supported by grants from the Instituto de Salud Carlos III, Fondo de Investigación Sanitaria (FIS PI12/00515), from the Department of Health (48/2011 and 58/2011) of the Gobierno de Navarra and from the CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Instituto de Salud Carlos III, Spain.

In vivo therapeutic effect of combination treatment of Scutellaria baicalensis with metformin on insulin signaling pathway

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Background & Aims: Dry root of Scutellaria baicalensis is one of the widely used herbs in traditional Chinese medicine for the treatment of metabolic diseases. Several main components such as baicalin and wogonoside have already been known for anti-dyslipidemia, anti-obesity and anti-diabetic effects.

Objectives: We hypothesized that co-administration of Scutellaria baicalensis extract and Metformin can exert better effect on obesity-induced insulin resistance and lipid metabolism than treatment with metformin alone.

Materials & Methods: We compared the effect of Metformin (100 mg/10 mL/kg/day) and co-administration of Metformin (100 mg/5 mL/kg/day) and Scutellaria baicalensis extract (200 mg/5 mL/kg/day) on Otsuka Long Evans Tokushima Fatty (OLETF) rats, which is a useful model of type II diabetes with obesity and used Long-Evans Tokushima Otsuka (LETO) rats as a control. Weight, fasting glucose, oral glucose tolerance test (OGTT) and intraperitoneal insulin tolerance test (IPITT), serum total cholesterol were measured after measured after the 12 weeks of drug intervention. Fatty liver PCR array was performed using liver samples to determine gene expression of 85 key genes related to fatty liver and hepatic insulin resistance.

Results: Both groups did not show significant reduction in weight, fasting glucose and serum total cholesterol concentration. However, both co-administration and metformin alone showed reduction in OGTT and IPITT, especially co-administration group showed better effect in IPITT. Fold changes of genes related to insulin signaling pathway, cholesterol metabolism and carbohydrate metabolism has changed substantially while genes related to apoptosis, adipokine signaling and inflammation pathway made no odds. Distinguishing gene expressions were observed such as Insulin growth factor 1(IGF1) and Suppressor of cytokine signaling 3 (SOCS3) between metformin group and co-administration group, although overall gene expressions showed similar tendency in a greater or less degree.

Conclusion: Although combination treatment of traditional herb and metformin did not show significant improvement in type II diabetes and obesity model, gene expression changes in insulin signaling pathway suggest possible synergy effect of co-administration.

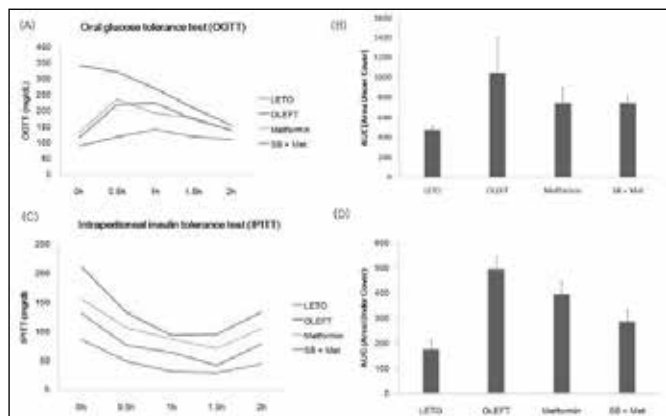


Fig. 1.

PO1.012

The influence of acute moderate-intensity exercise on circulating fibroblast growth factor (FGF) 21 and fetuin – A concentrations in lean and overweight men

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Background/Aim: FGF21 and fetuin-A are liver-secreted proteins (hepatokines) that modulate peripheral glucose metabolism. Hepatokine secretion is altered by hepatic steatosis which has prompted interest surrounding their role in Non-Alcoholic Fatty Liver Disease pathophysiology¹⁻². Circulating FGF21 and fetuin-A concentrations may be influenced by exercise but evidence in humans is limited. We sought to examine the impact of acute exercise on circulating FGF21 and fetuin-A; and explore any mediating effect of BMI.

Objective: To characterise the effects of acute moderate-intensity exercise on plasma concentrations of FGF21 and fetuin-A in lean and overweight men.

Material/Methods: Fourteen, age-matched (44 ± 17 years; mean \pm SD), healthy men were recruited into lean and overweight groups (BMI: 23.4 ± 1.5 vs. 28.6 ± 3.0 kg/m²). Participants completed exercise and control trials in a randomised, counterbalanced order, each lasting seven hours. In the exercise trial, participants performed continuous treadmill exercise (60% VO₂peak) during the first hour then rested. Participants rested throughout the control trial. Plasma concentrations of FGF21 and fetuin-A were measured at 0, 1, 1.5, 2.75, 4 and 7 hours via ELISA (R & D Systems, UK). **Results:** Fasting FGF21 concentrations were higher in overweight versus lean individuals (184 ± 29 vs 81 ± 22 pg/mL, $P = 0.02$), however BMI did not modulate responses over time nor the impact of exercise ($P \geq 0.20$). Subsequently, with groups combined, exercise significantly increased plasma concentrations of FGF21 versus control ($P = 0.02$) with pairwise comparisons revealing significant elevations at 1, 1.5, 2.75 and 4 hours ($P \leq 0.04$). Conversely, fetuin-A was unaffected by exercise ($P = 0.52$).

Conclusions: This study demonstrates that acute moderate-intensity exercise transiently increases circulating concentrations of FGF21 but not fetuin-A; findings are not mediated by BMI.

Reference:

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Acknowledgements: This study was supported by the NIHR, Leicester-Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit based at University Hospitals Leicester and Loughborough University. Conflicts of Interest & Funding Disclosures: The authors have no conflicts of interest to declare.

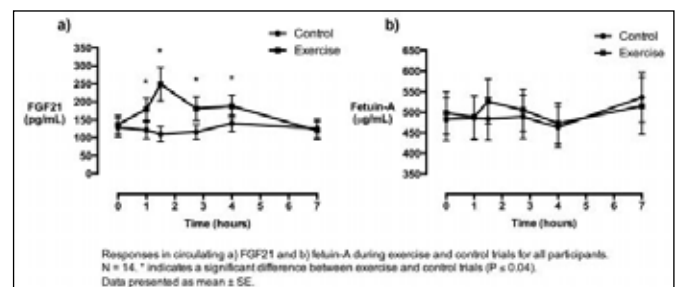


Fig. 1. FGF21 and fetuin-A responses during exercise and control trials
Trial Schematic

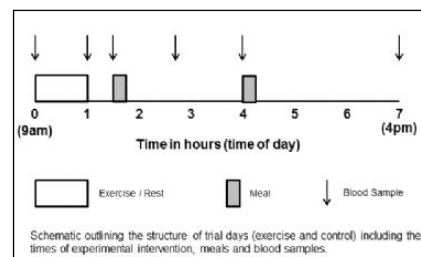


Fig. 2.

PO1.013

Attenuated atrial natriuretic peptide-mediated lipolysis in adipocytes of obese type 2 diabetic men

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Background: Beside catecholamines, atrial natriuretic peptides (ANP) are powerful regulators of lipolysis in human adipocytes. Although catecholamine-induced lipolysis is well known to be impaired in obese subcutaneous adipose tissue (SCAT), it is not known whether the effect of ANP is also altered in different adipose tissue depots of metabolically distinct obese humans.

Objectives: To assess whether ex vivo ANP-mediated lipolysis is altered in adipocytes derived from SCAT and visceral adipose tissue (VAT) of obese subjects, compared to age-matched lean men. Possible underlying molecular mechanisms were explored by looking at functional receptors in the natriuretic peptide-signaling pathway.

Material/Methods: Ex vivo catecholamine- and ANP-mediated lipolysis in isolated adipocytes derived from SCAT and VAT of lean ($n = 13$) and obese subjects, with ($n = 11$) or without type 2 diabetes ($n = 18$; HbA1C $< \text{or} \geq 6.5\%$), was investigated.

Results: Maximal catecholamine- and ANP-induced lipolysis (expressed as ratio of stimulated over basal lipolysis) in SCAT was decreased in obese men compared to lean men. This was most pronounced in obese type 2 diabetic subjects, showing a 1.5-fold decrease in catecholamine-mediated and a 2.1-fold decrease in ANP-mediated lipolytic response ($p < 0.05$). Non-diabetic obese men showed an intermediate response. In VAT, maximal responses were comparable between groups. Decreased ANP-mediated lipolysis in the SCAT of obese men was accompanied by a lower type-A ANP receptor (NPRA) mRNA and protein expression (1.7-fold for mRNA and 4.7-fold for protein expression compared to lean men).

No differences in NPRA expression were observed in the VAT. Gene expression of the scavenging type-C ANP receptor (NPRC) was increased in SCAT and VAT (1.8-fold and 2.3-fold increase, respectively) of obese compared to lean men, which did not translate into a higher NPRC protein content. Natriuretic peptide receptor expression correlated with measures of obesity (BMI, waist circumference and fat percentage) as well as metabolic parameters like fasting insulin, HOMA-IR and HbA1C.

Conclusion: Our results show that ANP-mediated lipolysis in SCAT of obese type 2 diabetic men is reduced, which might be (partly) explained by a decreased NPRA expression. Improving maximal ANP responsiveness in adipose tissue might be a potential novel strategy to improve obesity-associated metabolic complications.

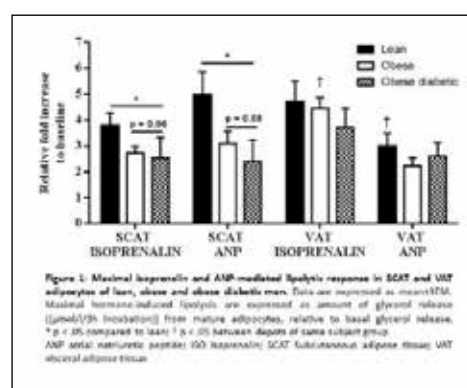


Fig. 1. Maximal isoprenaline- and ANP-mediated lipolytic response in SCAT and VAT adipocytes of lean, obese and obese diabetic men.

PO1.014

Predictors of metabolic changes in obese patients at 6 months after laparoscopic sleeve gastrectomy

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Objective: To evaluate the predictors of metabolic changes in obese patients who loose weight as a consequence of bariatric surgery.

Methods: We performed a 6-months prospective study in 40 obese patients operated between June 2012 and March 2015. Basal and 6 months after surgery serum concentrations of triglycerides, total cholesterol (TC), low density lipoproteins (LDL)-cholesterol, high density lipoproteins (HDL)-cholesterol and glycemia (Gly) were measured. Linear regression was used to assess the metabolic changes.

Results: Mean age was 40.06 (range 28 – 63 years), mean BMI was 43.1 kg/m² (range 35 – 59). The bariatric intervention was laparoscopic gastric sleeve (LSG). At 6 months after the intervention, the mean excess weight loss (%EWL) was 31.2%, the Body Mass Index (BMI) change was -24.3%, TC change was -5%, HDL-C change was -0.6%, TG change was -25.7% and Gly change was -7.9%. The BMI change at 6 months was a stronger predictor than %EWL for TC (P = 0.04), HDL-Cholesterol (P = 0.03), and GLY (P = 0.05). The BMI change did not significantly correlate with TG change.

Conclusions: The use of body mass index (BMI) could be useful to assess the adiposity and the BMI change after bariatric surgery could predict the metabolic changes.

PO1.015

Repression of SRC2 coactivator activity in liver by metformin or long-term starvation inhibits glucose, lipid and cholesterol biosynthesis

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Result Highlights: SRC2 coactivation of RORα on the proximal G6pase promoter is crucial for PGC-1α-dependent activation of G6pase and is repressed by strong PKA activity and anti-diabetic drug metformin. SRC2 coactivation of SREBP-1 on Fasn, Hmgcr and Hmgcs1 is inhibited by metformin.

Background: Key anabolic processes include gluconeogenesis and biosynthesis of lipids and cholesterol. Previously it was shown that SRC-2 knock-out mice exhibit fasting hypoglycemia and that SRC-2 coactivates RORα at the proximal G6Pase promoter¹. Microarray analyses of SRC2 liver-knock-out in mice have shown reduced expression of Srebp1, a master regulator of lipid and cholesterol biosynthesis^{2,3}. Key rate-limiting enzymes in these pathways were also downregulated, including Fasn (lipogenesis) and Hmgcr and Hmgcs1 (cholesterol synthesis)². Metformin is also known to suppress these pathways, although the specific mechanisms are yet to be determined.

Results: We have verified that a putative RORα-binding site in the proximal G6pase promoter is functional and that RORα/SRC2 binding on this site facilitates PGC-1α-dependent activation of G6Pase expression. We found that both overexpression of the catalytic PKA subunit (PKA-Cα) that mimics long-term starvation, and treatment with the anti-diabetic drug metformin reduced the SRC-2 protein levels, ability to coactivate RORα and recruitment to the G6Pase promoter, leading to strong repression of G6Pase expression. Furthermore, we found that SRC2 coactivates SREBP1 on Fasn, Hmgcr, Hmgcs1 promoters and that metformin reduces SRC2 expression and recruitment to these SREBP1 target genes, leading to reduced hepatocellular fat accumulation.

Acknowledgements: This work was funded by grants from the Western Norway Regional Health Authority and the KG Jebsen Center for Diabetes Research.

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PO1.016

Identification of transcript levels of Cd36 and Mest in the adipose tissue as biomarkers of the thin-outside-fat-inside (TOFI) phenotype in rats

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Background: Suckling period is revealed as a critical phase of development, where maternal over-nutrition may program the susceptibility of developing chronic disorders, such as obesity and metabolic alterations in adult life. Previously, we described that the intake of a cafeteria diet during lactation in rats could contribute to the so-called thin-outside-fat-inside (TOFI) phenotype in the offspring later in life, since produces lasting consequences in the metabolic health associated with greater fat accumulation, without higher body weight (Obesity Facts 8(Suppl1):193,2015). Identification of early biomarkers of these alterations may be of interest.

Aim: To identify early transcript-based biomarkers of unhealthy metabolic health in above described model and to ascertain whether they are maintained in adulthood.

Methods: Dams were fed with standard chow (control) diet or cafeteria diet throughout lactation. After weaning, offspring were fed with control diet until the age of 6-months. We studied in the offspring the expression levels of genes related to energy metabolism in peripheral blood mononuclear cells (PBMCs), inguinal (iWAT) and retroperitoneal (rpWAT) white adipose tissue at weaning and at 6-months of age, to identify genes with altered expression levels at early stages that lasted in adulthood.

Results: At weaning, compared to controls, the offspring of cafeteria dams (males and females) presented higher expression levels of Cd36 and Mest in rpWAT. These changes remained in adulthood, with the exception of Mest, which maintained higher expression levels only in males. Regarding iWAT, offspring of cafeteria dams also showed increased expression of Cd36 (males) and Mest compared to controls. In males, these changes were sustained in adulthood. Cd36 expression levels in PBMCs at weaning were also increased in the offspring of cafeteria animals compared to controls, but changes were not maintained in adulthood.

Conclusion: Lasting metabolic effects of maternal intake of a cafeteria diet during lactation are reflected in early changes at gene expression level in the adipose tissue, which are, in some cases, sustained in adulthood. In particular, transcript levels of Cd36 and Mest (only in males) in WAT emerge as biomarkers of TOFI phenotype with potential utility both at early stages of life and in adulthood.

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PO1.017

Long-term health consequences of gestational calorie restriction in rats are reversed by leptin supplementation throughout lactation

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Background/Aim: Maternal calorie restriction during gestation has adverse long-term effects in the offspring. Leptin is present in maternal milk and is an essential factor during lactation. We aimed to assess whether leptin supplementation throughout lactation in rats may improve the metabolic profile of the adult offspring of calorie-restricted dams during gestation and their response to an obesogenic diet.

Materials/Methods: Three groups of male Wistar rats were studied: the offspring of ad libitum fed dams (controls), the offspring of 20% calorie-restricted dams during gestation (CR), and CR rats supplemented with physiological doses of leptin throughout lactation (CR-Leptin). After weaning, all animals were fed a standard diet (SD) until 4 months of age, and then half of the animals of each group were moved to a high-sucrose high-fat (western) diet (WD) until 6 months of age. Body weight and food intake were followed. Energy expenditure and locomotive activity were measured in adulthood. Blood parameters, liver triglyceride (TG) content and expression of selected genes in white adipose tissue (WAT) and liver were analyzed at 6 months.

Results: Adult CR rats, but not CR-Leptin rats, displayed (under SD) greater adiposity index and feed efficiency than controls. CR animals also showed lower locomotive activity and energy expenditure than controls, together with higher HOMA-IR index and greater circulating TG and leptin levels. They also exhibited increased values of the respiratory exchange ratio (RER) than CR-Leptin animals, suggesting decreased capacity to oxidize fat. WD-fed CR animals showed signs of hepatic steatosis. Gene expression analysis revealed that CR animals, but not CR-Leptin animals, displayed indicators of lower capacity for WAT expansion, along with decreased lipogenesis and lipolytic capacity under SD, and impaired lipogenic response of liver to WD feeding, in accordance with impaired insulin sensitivity and peripheral leptin action.

Conclusions: Leptin supplementation with physiological doses throughout lactation in rats largely prevents detrimental effects on energy homeostasis and metabolic alterations in adulthood caused by inadequate fetal nutrition.

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PO1.018

The association between FTO and apelin mRNA expression in fat tissues among extreme obese and non-obese subjects

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Background & Aim: Fat mass and obesity-associated protein (FTO) and apelin as a newly recognized adipokine have been identified as candidate genes that correlate with the risk of obesity and insulin resistance. The aim of this study was to investigate the association of FTO and apelin gene expression in omental and subcutaneous fats among extreme obese and non-obese subjects.

Material/Methods: Omental and subcutaneous fats were obtained from 32 extreme obese (BMI ≥ 40 kg/m²) and 32 age- and sex-matched non-obese (BMI < 30 kg/m²) subjects, who underwent open abdominal surgery. The expression of FTO and apelin genes in the collected fat tissues was assessed by Real-Time PCR.

Results: Both the mRNA levels of FTO and apelin were not significantly different in omental and subcutaneous fats. However, apelin expression in fat tissues was approximately 19-fold higher among extreme obese subjects compared to non-obese ones ($P < 0.05$). The FTO expression in omental fat was negatively correlated with apelin expression in omental ($\beta = -0.789$, $P < 0.001$) and subcutaneous ($\beta = -0.718$, $P = 0.001$) fats among extreme obese subjects. In addition, FTO expression in subcutaneous fat was negatively correlated with apelin expression in omental ($\beta = -0.542$, $P = 0.020$) and subcutaneous ($\beta = -0.643$, $P = 0.004$) fats among extreme obese subjects.

Conclusion: FTO expression has negative correlation with apelin expression in both omental and subcutaneous fats among two studied groups.

Acknowledgement: The authors would like to thank Dr Mohammad-Reza Ebrahimi for surgical procedures. Conflict of Interest: None of the authors have any personal or financial conflict of interest. Keywords: FTO expression, apelin expression, subcutaneous fat, omental fat, extreme obesity.

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PO1.019

Dietary sulphur-containing, aromatic, acidic, basic, and branched chain amino acids with apelin gene expression

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Background & Aim: Apelin is a novel adipocyte-secreted hormone, proposed to link obesity with insulin resistance. In this study, we investigated whether apelin gene expression in visceral and subcutaneous adipose tissue was related to intake of several amino acid groups.

Material/Methods: Thirty two morbid obese and 32 age- and sex-matched non-obese subjects were selected. Visceral and subcutaneous adipose tissues were obtained during an abdominal open surgery and the apelin gene expression was assessed by Real-Time PCR. Dietary intake was collected using a valid and reliable food frequency questionnaire. The sulphur-containing, aromatic, acidic, basic, and branched chain amino acids (BCAA) were estimated.

Results: The mean body mass index for morbid obese and non-obese subjects was 45.3 and 25.6 kg/m², respectively. Apelin expression in visceral adipose tissue among non-obese subjects was correlated with sulphur-containing ($\beta = 0.434$, $P = 0.013$), BCAA ($\beta = 0.442$, $P = 0.011$), aromatic ($\beta = 0.432$, $P = 0.012$), and basic ($\beta = 0.436$, $P = 0.013$) amino acids. Moreover, we found significant correlations between subcutaneous adipose tissue apelin expression and sulphur-containing ($\beta = 0.480$, $P = 0.006$), aromatic ($\beta = 0.486$, $P = 0.006$), BCAA ($\beta = 0.556$, $P = 0.001$) among non-obese subjects.

Conclusions: Apelin gene expression was correlated with sulphur-containing, BCAA, and aromatic among non-obese subjects.

Reference:

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Acknowledgement: The authors would like to thank Dr Mohammad-Reza Ebrahimi for surgical procedures. Conflict of Interest: None of the authors have any personal or financial conflict of interest.

PO1.020

Dietary control before pregnancy in rats previously made obese by cafeteria diet feeding prevents metabolic alterations in their offspring at early ages

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Background: There is an increase in the incidence of obesity in women of childbearing age, which can lead not only to certain complications during pregnancy, but also to health disorders in their offspring. The general recommendations are to reduce body weight before pregnancy; however, there is no unanimous consensus on how and when lose the excess of weight.

Aim: To study the health effects on the offspring of dietary control one month before pregnancy in rat dams previously made obese by cafeteria diet feeding.

Methods: Female rats were fed with a cafeteria diet from days 10 to 100 of age. A parallel control group of females rats fed with standard diet (SD) was also followed. One month before pregnancy, the cafeteria diet was replaced with a SD (postcafeteria model), and females from control and postcafeteria groups were mated with males. At early age (26-day-old), offspring of control and postcafeteria dams were sacrificed under fasting or ad libitum feeding conditions.

Results: At sacrifice, male offspring of postcafeteria dams presented a lower body weight than controls, but no differences in body fat content. The hepatic expression of genes related to lipid metabolism was also similar to controls. Male offspring of postcafeteria dams had a lower expression of lipogenic genes (Pparg, Srebf1 and Fasn) and of Pnpla2 in the retroperitoneal white adipose tissue (rpWAT) compared to controls. The response to the fasting condition was not impaired, either in liver or in rpWAT. Female offspring of postcafeteria dams showed no differences in body weight, body fat content and expression pattern of genes related to lipid metabolism in rpWAT compared to controls. They presented a lower hepatic expression of lipogenesis-related genes compared to their controls, although the response to fasting conditions was not impaired.

Conclusion: All in all, results suggest that the expected harmful effects associated to maternal dietary obesity on their offspring may be apparently prevented by dietary normalisation one month before pregnancy.

Acknowledgement: AGL2012–33692

PO1.021

Dietary whey proteins alter the composition of the gut microbiota, intestinal weight and energy balance

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Background/Aims: We showed that whey protein isolate (WPI), a by-product of cheese manufacture, reduced weight gain in mice compared to casein (CAS) intake [1]. Here we tested the hypothesis that WPI altered the composition of the gut microbiota and intestinal nutrient sensing and transport related genes regulating body weight, leading to reduced weight gain.

Objectives: Assess the impact of WPI on the composition of gut microbiota, and intestinal genes of interest.

Material/Methods: Male 5 week old C57/BL6 mice were provided a 10% energy fat with either 20% energy WPI or CAS for 17 weeks (n = 8). Prior to study termination, energy expenditure was measured using TSE PhenoMaster cages, and the composition of the gut microbiota was determined by 16S rRNA amplicon sequencing of the DNA. Intestine was isolated from fasted mice, weighed and ileal gene expression investigated using Real-Time PCR.

Results: Mice fed WPI had a similar body weight trajectory, despite consuming more energy than CAS fed controls (Figure A and B). Since energy expenditure did not differ between groups (Figure C), the data suggest an energy loss with WPI intake. The ileal genes for glucose transporter 2 (Glut 2) and fatty acid transporter 4 (FATP4) showed an opposite (non-significant) response to energy intake in WPI fed mice (Figure D), and the composition of the gut microbiota showed a distinct clustering away from CAS fed controls (Figure E). Notably, WPI reduced the intestinal weight (Figure F).

Conclusion: The distinct effects of WPI on the composition of the gut microbiota, ileal gene expression and intestinal weight may underlie the energy loss. The WPI-related mechanism of energy loss may provide a novel route to prevent weight gain and obesity.

Acknowledgement: This work was funded by Teagasc, Ireland.

Reference:

1 McAllan, L., et al., Whey protein isolate counteracts the effects of high fat diet on energy intake and on hypothalamic and adipose tissue expression of energy balance related genes. *Br J Nutr.* 2013. 110(11): p. 2114–26.

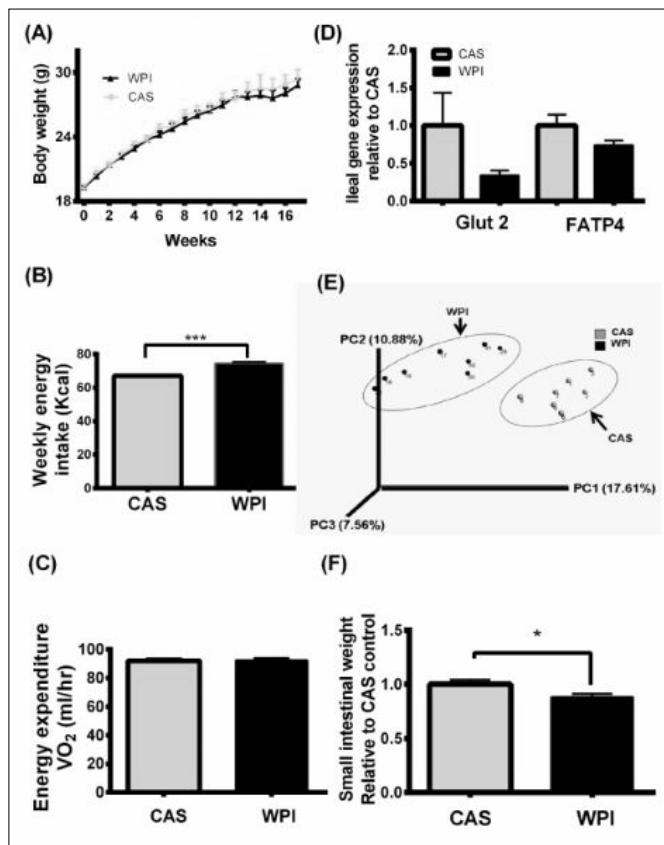


Fig. 1. Impact of intake of whey protein isolate (WPI) relative to casein (CAS) on energy balance related parameters in male C57/BL6 mice (n = 8). Shown are (A) body weight, (B) weekly energy intake, (C) energy expenditure, (D) ileal gene expression, (E) the composition of the gut microbiota and (F) intestinal weight. Data analysed by t-Test and shown as average \pm standard error. * $P < 0.05$, *** $P < 0.005$.

PO1.022

Effect of exenatide on post-prandial glucose disposal and beta-cell function in non-diabetic morbidly obese patients

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In diabetic patients, exenatide lowers glucose by potentiating glucose-induced insulin release, delaying gastric emptying and improving β -cell function. The effect of exenatide on glucose disposal and β -cell function in non-diabetic subject is not clear.

Aim: To study, in non-diabetic morbidly obese subjects, the effect of exenatide on splanchnic glucose retention and lipolysis under post-prandial conditions, and its effect on β -cell function and glucagon concentrations.

Methods: Thirty morbidly obese nondiabetic patients (BMI 45.2 ± 1.1 kg/m²) were randomized to Exenatide 10 μ g bpd (EX, n = 15) or control (CT, n = 15) for 3 months. At baseline and study end, patients received a meal test/double tracer study (MTT) with 2H5-glycerol (to measure lipolysis).

Results: At 3 mos, the EX showed a significant reduction in body weight (121 ± 6 to 114 ± 6 kg, $p < 0.001$ vs 121 ± 3 to 118 ± 5 of CT). During the MTT, mean glucose (5.7 ± 0.2 vs 6.1 ± 0.1 mmol/L, $p < 0.01$) and insulin levels (295 ± 37 vs 392 ± 53 pmol/L, $p = 0.03$) decreased significantly, while β -cell glucose sensitivity was unchanged. The time-course of plasma glucose, insulin, and insulin secretion showed a lower peak at 60 min, with a rapid drop thereafter until 240 min. This pattern was due to a re-

duction in the rate of oral glucose appearance in the 2nd-3rd hr postmeal (AUC = 570 [517] μ mol/kgffm vs 1054 [352] of CT, $p < 0.01$), followed by an increase during the subsequent 3 hrs (AUC = 910 [715] μ mol/kgffm vs 628 [359], $p = 0.05$). After an initial suppression, endogenous glucose production resumed at higher rates through the 2nd-3rd hr postmeal (AUC = 159 [88] μ mol/kgffm vs 89 [66] of CT, $p = 0.05$). Total amounts of oral and endogenous glucose appearing over 6 hours were similar in EX and CT. The glycerol Ra after the meal showed in EX a slight reduction during the first two hours post-meal followed by an increase, but the total release was not different between the two groups. Glucagon levels after the meal was significantly reduced in EX ($p = 0.002$).

Conclusions: In morbidly obese non-diabetic subjects exenatide causes weight loss, decreased postprandial glycemia and glucagon release without changes in β -cell function. These effects are in part consequent upon delayed oral glucose appearance in the systemic circulation.

PO1.023

Changes in Inflammation and Vitamin B Status after Bariatric Surgery

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Background & Aims Obesity is a low-grade inflammatory state. In conditions with chronic inflammation low levels of vitamin B6 have been described, Pyridoxal-5-phosphat (PLP) is the most commonly used marker of vitamin B6. Also the ratio between tryptophan:kynurenine can be used as a marker of inflammation, as the enzyme metabolizing tryptophan to kynurenine is induced by IFN γ and TNF α . However, these inflammatory markers are not well studied during weight loss. Objective To examine whether weight loss due to bariatric surgery, was associated with a reduction in chronic inflammation and alter the level of PLP.

Material & Methods: We included 37 participants (25 women, median age 48 years) who underwent sleeve gastrectomy (n = 25) or duodenal switch (n = 12). Median BMI was 43.8 and 38% were diagnosed with type 2 diabetes (T2D). Fasting blood samples were obtained preoperatively and 3, 6, 9 and 12 months postoperatively. Plasma concentrations of tryptophan, kynurenine, kynurenine acid, anthranilic acid, 3-hydroxykynurenine, xanthurenic acid, 3-hydroxyanthranilic acid, quinolonic acid, neopterin, pyridoxal 5'-phosphate (PLP), riboflavin, nicotinamide, N1-methylnicotinamide and nicotinic acid were analysed by liquid chromatography/tandem mass spectrometry (LC-MS/MS). Changes over time between repeated end-point measures were assessed with a random intercept mixed model, adjusted for operation method.

Results: Fasting glucose, HbA1C and triglycerides decreased, whereas HDL-cholesterol levels increased after surgery ($P < 0.05$). We observed a decrease in tryptophan and most of the kynurenine metabolites. Kynurenine:tryptophan-ratio and CRP decreased after surgery, indicating a reduction in the inflammatory response. Levels of neopterin did not change. Vitamin B6 increased during weight loss. PLP was not significantly changed after 3 months, but an increase was observed one year postoperatively.

Conclusions: Markers of chronic inflammation that can be used as a measure of IFN- γ mediated activation changed during weight loss after bariatric surgery.

Issues in 24-hour central temperature monitoring using an ingestible miniature telemetric sensor in obese and lean subjects

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Introduction: Recent technological development using miniature ingestible sensors (IS) to assess central body temperature (T_c) has progressively supplanted the classical semi-invasive tele-thermometer in physiological research.

Material & Methods: In order to assess the potential performance of IS, we have measured the profile of central temperature (T_c) over day-time and night-time in 23 obese and non-obese subjects, who ingested a 10g capsule temperature sensor (CorTemp, HQ Inc, USA), which continuously recorded 24 hour intra-gut temperature every 20 s. An ex-vivo study comparing IS with classical mercury and electronic thermometers in water of different temperatures, was performed to track accuracy and precision of IS.

Results: We confirm the clear circadian temperature profile classically reported in humans, with no significant differences in T_c between obese and lean subjects during sleep, during resting post-absorptive conditions, as well as during structured dynamic or isometric exercises. However, the ex-vivo study shows uncertain accuracy among IS, and progressive slow drift of T_c over time. **Discussion:** We have identified several endogenous and exogenous factors of practical interest for investigators: (i) "turbo" gut transit time (about 12h or less, in one out of every 5 subjects); (ii) sudden errors in tele-transmission of T_c; (iii) non-consistent bias in T_c measurements; (iv) potential influence of the anatomical location of IS within the gut on T_c; and (v) confounding effect of acute cold/hot beverages ingested during the study on T_c.

Conclusion: Since T_c is regulated within a very narrow range in the healthy body (one degree °C only), cross-sectional and longitudinal (interventional) physiological investigations on T_c requires great accuracy and precision (ideally better than 0.1 degree °C). Although the IS methodology appears of great interest, it still requires a reduction in the inherent error of measurement, and more inter-laboratory investigations on the above factors.

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The association between total, animal and plant protein intakes and apelin gene expression

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Background & Aim: While the effect of dietary intake on apelin gene expression has been assessed in a number of animal studies, data in human was rare. The aim of the current study was to evaluate the association between intake of total, animal, and plant protein intakes and apelin gene expression in adipose tissues among severe obese and non-obese subjects.

Material/Methods: A total of 32 severe obese subjects (BMI ≥ 40 kg/m²) and 32 age- and sex-matched non-obese (BMI < 30 kg/m²) were eligible. Dietary intake was collected using a valid and reliable food frequency questionnaire, and daily intake of total, animal, and plant protein was calculated. Visceral and subcutaneous adipose tissues were obtained during

open abdominal surgery with minimal impact on dietary intake. The mRNA levels of apelin in visceral and subcutaneous adipose tissues were assessed by Real-Time PCR.

Results: Apelin gene expression in visceral adipose tissue was positively correlated with total protein in both severe obese ($\beta = 0.318$, $P = 0.036$) and non-obese subjects ($\beta = 0.419$, $P = 0.017$). After adjusting for total energy intakes, the association was remained significant only in non-obese subjects ($\beta = 0.363$, $P = 0.045$). Among non-obese subjects, apelin gene expression in subcutaneous adipose tissue have positively correlated with total protein intake ($\beta = 0.474$, $P = 0.007$); however, further adjustment for energy intake attenuated the association. We found no significant association between animal and plant protein and apelin gene expression in both tissues.

Conclusions: Higher intake of total protein has a positive correlation with apelin gene expression in visceral adipose tissue among non-obese subjects.

Reference:

Castan-Laurell et al. Apelin, diabetes, and obesity. *Endocrine* 2011;40(1):1–9.

Acknowledgement: The authors would like to thank Dr Mohammad-Reza Ebrahimi for surgical procedures. Conflict of Interest: None of the authors have any personal or financial conflict of interest.

Is Apelin Gene Expression and Concentration Affected by Dietary Intakes? A Systematic Review

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Background & Aim: Apelin is one of the most potent molecules that has been described as a beneficial adipokine related to obesity. Several studies have been shown that patterns of gene expression and level of apelin concentration in response to nutrients or dietary intakes may be changed. We carried out a comprehensive review of the literature to answer the question whether micro- and macro-nutrient and dietary patterns have association with adipocyte gene expression and serum concentration of apelin in human and animal.

Methods: We systematically searched on the association between dietary intakes and apelin in English language publications available on the electronic literature of MEDLINE, EMBASE, and google scholar till November 2015. Additional citations were identified by hand-searching reference lists of all selected articles. We included studies that reported the micro- and macro nutrient and specific diet such as high-fat diet on human and animals and excluded studies investigated the effect of exercise and ex vivo assays in human or animal cell lines and serum. Any changes in apelin plasma concentration and regulation of adipose tissues gene expression were considered.

Results: From a total of 1075 articles, we identified 12 relevant studies (six studies in each human and animal studies). Overall, two studies in human have shown that calorie-restriction diet in obese subjects decrease apelin concentration. In addition, five animal studies reported that higher intake of fatty acids and eicosapentaenoic acid (EPA) increased apelin gene expression and concentration. Given the paucity of available data, the heterogeneity of study designs used, and exposures tested, no quantitative meta-analysis was justified.

Conclusion: Hypo-caloric diet can reduce apelin concentration in humans study. In addition, higher intake of total fatty acids and EPA may increase apelin gene expression and concentration.

Reference:

Bertrand, et al. Apelin and energy metabolism. *Front Physiol.* 2015, 10;6:115.

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PO1.027

Search of new early cardiovascular health biomarkers in the model of obesity prevention by pectin supplementation

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Background and Aims: We have developed a model of physiological supplementation with high esterified pectin from apples able to prevent obesity/overweight and its complications. We aimed to study the potential in cardiovascular health.

Objectives: To describe beneficial effects of pectin supplementation in cardiovascular health, and new early biomarkers related with blood pressure in accessible biological samples (peripheral blood mononuclear cells –PBMCs). Materials and methods. We started with an obesity-prone model to be supplemented: CR rats (offspring of 20% calorie-restricted, pregnancy days 1–12). After weaning, male offspring was fed with a standard diet or supplemented with 10% pectin until 4-month-age; then half of each group was also supplemented with 30% sucrose (obesogenic diet). Control (non-CR) groups were also studied. At 5-months, blood pressure and heart rate were measured. Animals were sacrificed at 6-month-age. Heart mRNA expression levels of key genes Nppa, Nppb and Nppc (natriuretic peptides), and Myocardin and Myostatin (control of heart growth) were determined by RT-qPCR. Nppa and Myostatin expression was also studied in PBMCs.

Results: CR condition was detrimental for systolic and diastolic blood pressure and heart rate, but pectin supplementation reversed and even improved their performance. Heart Nppa and Mstn (myostatin) expression suffered the most important changes in response to CR condition and to pectin. CR condition caused decreased levels of heart Nppa mRNA, even more with high-sucrose diet, which were restored by pectin supplementation. Heart Mstn mRNA levels were increased by CR condition while pectin supplementation restored them. Subsequently, we analysed their expression in PBMCs at different ages. The main result was the increase in Nppa expression at four months of age with pectin supplementation.

Conclusion: Considering Nppa expression in heart and PBMCs, and the importance of Nppa in blood pressure regulation, we propose it as a possible early health biomarker, which deserves more studies. Moreover, the experimental model used and mRNA expression in PBMC raise as interesting tools in the search of new early health biomarkers of cardiovascular function.

PO1.028

Age dynamics of metabolic syndrome in men with different types of obesity

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Introduction: The purpose of this study was to research the dynamics of the incidence of metabolic syndrome and its components in men with android and gynoid types of obesity in different age groups.

Methods: The study included 224 men aged 22 to 74 years. All men have a BMI over 25 kg/m². They were divided into 3 age groups: group 1 made the men of the first period of mature age (22 to 35 years, n = 47) group 2 - the second period of mature age (36 to 60 years, n = 128) group 3 - elderly men (61 to 75 years, n = 49). In every age group we identified the presence of gynoid or android type of obesity, what was determined basis on the value of the waist to hip circumference ratio (WC/HC): if the WC/HC < 0.95 assigned gynoid type, and the WC/HC0.95 – android type of

obesity. To identify the metabolic syndrome (MS) and determining the frequency of its components used criteria NCEP-ATP III modified in 2005.

Results: Generally in the selection frequency of the MS in group 1 was 40%, in Group 2–64%, and in group 3–51%. The incidence of the components of MS prevalent in men with android type of obesity compared with gynoid. While significant differences were identified on such component as abdominal obesity ($\chi^2 = 17.5$, $p < 0.0000$) and hyperglycemia ($\chi^2 = 9.5$, $p < 0.0021$), and as a result the frequency of MS ($\chi^2 = 10.3$, $p < 0.0013$). The ratio of men with gynoid type of obesity among men with android type of obesity in 1, 2 and 3 age groups was 1.5:1; 0.3:1 and 0.2:1, respectively. The frequency of MS in men with android type of obesity in all age groups was higher than that in men with gynoid type of obesity in 4 - 2 - 5 times, respectively

Conclusion: The frequency of android type of obesity increases in men depending on age, that is associated with an early increase of occurrence both separate components and generally the MS, that determines in men in the beginning of the second period of mature age increased risk of cardiovascular disease, atherosclerosis, type 2 diabetes.

PO1.029

Effect of weight loss on soluble leptin receptor, the free leptin index and vascular endothelial growth factor in patients with metabolic syndrome

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Introduction: Metabolic syndrome (MS) is characterized by insulin resistance (IR), hyperleptinaemia and endothelial dysfunction. The aim of the study was to assess the level of soluble leptin receptor (sLR) and vascular endothelial growth factor (VEGF) in MS patients.

Methods: 60 MS patients (average age of 42.3 ± 8.3 years, mean BMI 38.0 ± 10 kg/m²), was compared with a control group of 20 healthy people (age 39.4 ± 5.3 years, mean BMI 27 ± 1.3 kg/m²) were examined before and after 6 months of low-energy diet intervention. Levels of insulin, HOMA index, leptin, sLR, VEGF were measured. Free leptin index (FLI) was determined by calculating (leptin x100/sLR).

Results: HOMA index in MS patients was higher compared with controls (5.2 ± 2 vs. 2.2 ± 1; $p < 0.01$) and showed a decrease after weight loss (3.3 ± 2; $p = 0.04$). Leptin was higher in MS: 42.8 ± 19.7 ng/ml vs 21.2 ± 9.1 ng/ml; $p < 0.001$, but values of sLR were lower than in the healthy group: 13.5 ± 3.48 ng/ml vs. 20.4 ± 7 ng/ml; $p < 0.01$. The levels of sLR were inversely related with the BMI ($R = -0.35$; $p = 0.01$), the HOMA index ($R = -0.46$; $p = 0.04$) and leptin ($R = -0.31$; $p = 0.01$). FLI in the MS group compared with controls: 347 un. vs 89 un.; $p < 0.01$. VEGF was higher in MS: 91.8 ± 20.7 ng/ml vs 75.2 ± 9.1 ng/ml; $p = 0.04$ and did not changed. After weight loss concentration of sLR increased to 13.5 ± 3.4 ng/ml ($p < 0.01$), plasma leptin levels decreased to 21.2 ± 9.2 ng/ml ($p < 0.01$), and FLI decreased to 128.5 units ($p < 0.01$).

Conclusion: Weight loss induced a significant increase of sLR and decrease of the FLI. The data indicate that the calculation of the FLI greater significance for the dynamic control than the level of total leptin. This work was supported by the Russian Science Foundation No. 14–15–00809.

Gastrointestinal effects of green plant thylakoids

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Background & Aims: Satiety is regulated by several physiological and psychological factors, including gastric distension and emptying-rate, GI transit-time, digestion, absorption of nutrients and secretion of appetite-regulating hormones. Green-plant thylakoids increase satiety by affecting secretion of ghrelin, CCK and GLP-1, resulting in body-weight loss (1). The aim of this study was to investigate if thylakoids (Appethyl®) affects GI-passage and microbial composition.

Objectives: 1) Does thylakoid supplementation affect gastric emptying, intestinal transit and plasma concentrations of CCK, both acutely and in a two-week diet intervention study in rats? 2) Does three-months daily thylakoid intake affect the faecal microbial composition and the amount of faecal fat in an interventional study with overweight women?

Materials & Methods: Sixteen rats were gavage-fed a control or thylakoid-supplemented-HFD 30 minutes before receiving Evans blue. Another sixteen rats were fed a control-HFD or thylakoid-HFD for two weeks prior to an intragastric bolus-dose of Evans blue. The amount of Evans blue in the stomach and the distance of migration in the intestine after 30 minutes were used as a measurement of gastric emptying and intestinal transit. Faecal composition from 34 human volunteers receiving thylakoid supplement for three months vs control was analysed for microbial composition using 16S rRNA gene-sequencing and qPCR, and the amount of faecal fat was determined by dichloromethane- extraction.

Results: Rats treated with thylakoids, both acutely and given as a two-week food supplement showed decreased gastric emptying and intestinal transit time, as compared to control rats. The total bacteria, and specifically the “Bacteriodes fragilis” group, were increased by thylakoid treatment versus placebo, while thylakoids do not cause steatorrhea.

Conclusion: Dietary thylakoids affect satiety both via appetite hormones, as has previously been shown (1), and by increasing GI fullness by prolonging gastric emptying and GI transit rate. Thylakoids also affect the microbial composition without causing GI adverse effects such as steatorrhea.

Acknowledgement: Appethyl® was donated by Greenleaf Medical AB, Sweden. The Lennander Foundation, Sweden, funded the study. Conflict of interest None.

Reference:

1 Erlanson-Albertsson, C. and Albertsson, P-A., The Use of Green Leaf Membranes to Promote Appetite Control, Suppress Hedonic Hunger and Lose Body Weight. *Plant Foods Hum Nutr*, 2015.70(3):281–90.

Is there any association between anthropometric measurements and apelin gene expression in obese and non-obese subjects?

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Background: and Aim: The association of apelin functions as an adipokine with obesity and insulin resistance has been reported in which a positive correlation was identified between apelin plasma levels and obesity-related factors. In the current study, we aimed to investigate the

association of apelin mRNA expression in omental and subcutaneous adipose tissues with anthropometric indices and blood pressure (BP) among morbid obese and non-obese individuals.

Material/Methods: Thirty two severe obese and 32 age- and sex-matched non-obese subjects were eligible for the study. Omental and subcutaneous adipose tissues were obtained during open abdominal surgery. The mRNA expression of apelin in omental and subcutaneous adipose tissues were assessed by Real-Time PCR. Height, weight, body mass index (BMI), waist, hip, and neck circumferences, and BP were determined according to standard protocols.

Results: The mean of BMI for morbid obese and non-obese subjects was 45.3 and 25.6 kg/m², respectively. Apelin gene expression was not significantly different between omental and subcutaneous adipose tissue in each group. However, apelin mRNA expression in adipose tissues was approximately 19-fold higher among morbid obese subjects compared to non-obese ones ($P < 0.05$). Among morbid obese subjects, omental apelin mRNA expression correlated with body weight ($\beta = 0.45$, $P < 0.001$), BMI ($\beta = 0.48$, $P < 0.001$), waist ($\beta = 0.34$, $P = 0.007$), hip ($\beta = 0.33$, $P = 0.007$) and neck ($\beta = 0.31$, $P = 0.042$) circumferences. Among non-obese subjects, apelin mRNA expression in both tissues had significant positive correlation with body weight and waist circumference. No significant correlation was found between BP and apelin gene expression.

Conclusion: In conclusion, our data indicate that up-regulation of apelin in adipose tissues is associated with obesity related indices.

Acknowledgement: The authors would like to thank Dr Mohammad-Reza Ebrahimi for surgical procedures. Conflict of Interest: None of the authors have any personal or financial conflict of interest.

Reference:

1 Boucher et al. Apelin, a newly identified adipokine up-regulated by insulin and obesity. *Endocrinology* 2005;146(4):1764–71.

Assessment of metabolic syndrome risk and severity

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Introduction: Metabolic syndrome (MS) is the complex of the modified risk factors for cardiovascular diseases, atherosclerosis, type 2 diabetes and etc. The fact of absence or presence of MS is important for population-based studies, and at the individual level is important quantitative assessment of risk and severity of MS. Previously we have received a patent of the Russian Federation № 2444298 “Method of diagnosing the metabolic syndrome” where was proposed Scoping the presence and severity of MS. The purpose of this study was to estimate risk of development and severity of the metabolic syndrome at the patients hospitalized in therapeutic department.

Methods: Was determined the existence and expression of the main (arterial hypertension, abdominal obesity, hyperglycemia, insulin resistance, hypertriglyceridemia, high-density lipoprotein low level) and additional (overweight, hyperuricemia, hypercholesterolemia, non-alcoholic fatty liver disease) metabolic syndrome components in points. MS was diagnosed at the presence of 3 main components at least or sum of points more than 6. Patients hospitalized in therapeutic department were included by random sequential selection in the studied group.

Results: The study involved 41 men and 67 women, aged from 24 to 73 years. Patients with lack of the MS components were not revealed. Based on the offered method the metabolic syndrome was taped in 57.4% of patients. Among them, the percentage distribution of light (6.0 - 8.5 points), medium (9.0 - 11.5 points) and heavy (> 12 points) severity was 37.1: 27.4: 35.5, respectively. Other patients have percentage distribution of the degree of risk low (0.5 - 1.5 points), moderate (2 - 3.5 points) and high (9.0 - 11.5 points) was 30.5: 15.2: 54.3, respectively.

Conclusion: Determination the degree of the risk of development MS can enhance the efficiency of early prevention of cardiovascular disease, and the severity of MS – to determine the potency of the treatment.

PO1.033

The effect of metformin and SGLT 2 inhibitors on insulin resistance in rats with experimental model of hypothyroidism

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Introduction: Thyroid disorders are one of the major endocrinopathy. There is a large variety of studies that suggest the connection between hypothyroidism and insulin resistance together with changes in the secretion of ghrelin, leptin and adiponectin. Thereafter, the aim of our study was to investigate the effect of metformin and SGLT 2 inhibitors on insulin resistance in rats with experimental model of hypothyroidism, and their possible effect on leptin, adiponectin and ghrelin.

Methods: Male Wistar rats ($n = 30$) were divided into two groups. The first ($n = 15$) - an experimental model of hypothyroidism, treated with Propyluracil, the second ($n = 15$) - a control group. All rats had free access to water and standard chow food. The experimental model of hypothyroidism lasted for 1-month period. At the end of the experiment, rats were anesthetized. Different biochemical parameters (TSH, fT3 and fT4) by ELISA methods. Insulin resistance was evaluated by HOMA index. Leptin/adiponectin ratio was measured. Then, rats were divided into three new groups. First group treated with metformin 50 mg/kg. Second group treated with SGLT 2 inhibitor – 3 mg once daily, and third group – control.

Results: We expect that body weight and insulin resistance will be influenced by the treatment.

Conclusions: The newest drug SGLT – 2 inhibitor exerts beneficial effect on insulin resistance and leads to reduction of body weight in male rats of experimental model of hypothyroidism.

PO1.034

Mechanism linking diabetes mellitus and obesity

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Body mass index has a strong relationship to diabetes and insulin resistance. In obese individuals, the amount of nonesterified fatty acids, glycerol, hormones, cytokines, proinflammatory markers, and other substances that are involved in the development of insulin resistance, is increased. The pathogenesis in the development of diabetes is based on the fact that the β -islet cells of the pancreas are impaired, causing a lack of control of blood glucose. The development of diabetes becomes more inevitable if the failure of β -islet cells of the pancreas is accompanied by insulin resistance. Weight gain and body mass are central to the formation and rising incidence of type 1 and type 2 diabetes. This literature review will demonstrate the facts that link obesity with insulin resistance and pancreatic β -cell dysfunction. In conclusion, new approaches in managing and preventing diabetes in obese individuals must be studied and investigated based on the facts

PO1.035

A cooling protocol prior PET/CT scan for BAT activity assessment: Preliminary results from the ACTIBATE study

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Background: Brown adipose tissue (BAT) is considered an attractive target as a therapy against obesity. BAT activity is measured through Positron Emission Tomography/Computerized Tomography (PET/CT). Supraclavicular skin temperature after cold exposure seems to be a valid indicator of BAT activity in humans (1).

Objectives: To determine if a two hours cold exposure protocol before the PET/CT scan induce the same skin temperature changes registered during a shivering threshold protocol assessment.

Material & Methods: A total of 23 young adults (18.5 ± 1.9 years; 25.7 ± 6.03 Kg/m²; 65.2% women) participated in the study. Shivering threshold was determined through an incremental cooling protocol where participants rested in a room ($18.9 \pm 0.4^\circ\text{C}$) wearing a water-perfused vest until shivering was reported. 48 hours later participants rested in the same room ($18.8 \pm 0.3^\circ\text{C}$) wearing the same water-perfused vest at a temperature 3°C above the individually measured shivering threshold during one hour. Immediately after, the water temperature was increased 1°C and kept for one more hour. Participants wore a set of iButtons on 20 skin points. Results: After the 2h of cold exposure, mean, proximal and distal skin temperature decreased significantly (all $p \leq 0.001$) while supraclavicular-to-chest temperature gradient increased ($p < 0.001$). The decrease of the mean and distal skin temperature was significantly higher in the shivering threshold protocol than in the 2h protocol before the PET/CT scan ($p < 0.027$). However, we did not find differences in proximal and supraclavicular skin temperature, nor in supraclavicular-to-chest temperature gradient (all $p > 0.5$).

Conclusion: Proximal and supraclavicular skin temperature changes are similar after a shivering threshold protocol than after the designed 2 hours cold exposure previous to the PET/CT scan. This finding suggests that this protocol induce maximum non-shivering thermogenesis, and thus it could be used to measure maximal BAT activity.

Reference:

1 Boon et al. (2014). Plos one: Jun 12:9(6)

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Obese white adipose tissue over-secretes FNDC5/IRISIN

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Background and Aims: FNDC5/irisin was identified as a new signal released by muscle tissue after exercise able to stimulate white adipose tissue (WAT) “browning”, to improve its metabolic profile and increase the overall energy consumption of the individual (1). Under this context, we have recently described FNDC5 as an adipokine expressed and secreted by rat WAT, especially in situations of obesity (2). Further, we showed that circulating FNDC5/irisin levels are elevated in obese humans compared with normal weight individuals, and positively correlated with adiposity in independent cohorts of patients (3). We hypothesize that WAT might contribute to irisin circulating levels and that this contribution varies according to the physiological and pathological status (3).

Objective: To characterize the expression and secretion of the new adipokine FNDC5/irisin on WAT and its role in obesity.

Material/Methods: Human WAT explants from lean and obese subjects and C3H10T1/2 murine cells (pre- and adipocytes) for the expression and secretion of FNDC5/irisin by qRT-PCR, ELISA, and immunodetection among others were used.

Results: A monoclonal antibody against the FNDC5 extracellular domain (aa 42–112) detects three bands/spots at 25, 15 and 12 kDa in both human tissue explants and murine adipocyte cells. Interestingly, only differentiated C3H10T1/2 adipocytes expressed and secreted FNDC5/irisin paralleling well known adipogenesis markers. Human WAT from obese individuals, and subcutaneous in a greater extend, show increased expression and secretion of FNDC5/irisin compared to healthy adipose explants. This secretion pattern paralleled FNDC5/irisin circulating levels.

Conclusion: C3H10T1/2 adipocytes are a good tool for studying FNDC5/irisin in vitro. Human WAT secretes three different isoforms of FNDC5/irisin protein which are all elevated in obese compared to healthy subjects. Human obese adipose tissue could be over-secreting FNDC5/irisin in an attempt to counteract the metabolic alterations associated to obesity.

References:

- 1 Bostrom et al., Nature 2012;
- 2 Roca-Rivada et al., Plos One 2013;
- 3 Crujeiras et al., Clin Endocrinol 2015.

Acknowledgments: ISCIII/PI13/01915/Cofinanciado FEDER. Perez-Sotelo D is supported by IDIS; Pardo M is a MSII Fellow (ISCIII).

Jussara (*Euterpe edulis*) MART.) supplementation in maternal diet increase UCP-1 expression and modify corporal composition in offspring

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Background: Recently the brown adipose tissue (BAT) was recognized in adults and inversely correlated with body mass index. Research to evaluate the effects of diet in uncoupling protein 1 (UCP1) in BAT.

Objective: Investigate the effect of jussara supplementation, anthocyanin-rich fruit, in the maternal diet rich in trans fat acid (TFAs) on the protein expression of UCP1 and corporal composition in 21-day-old offspring.

Methods: On the first day of pregnancy Wistar rats were divided into four groups: control diet (C), control diet supplemented with 0.5% jussara (CJ), diet enriched with hydrogenated vegetable fat, rich in TFAs (T), or T diet supplemented with 0.5% Jussara (TJ) during pregnancy and lactation. Was measured the carcass lipid and protein content as the retroperitoneal white adipose tissue (RET) and BAT. Protein expression of UCP1 in the BAT by Western blotting. Data were analyzed using two-way ANOVA followed by Tukey's post hoc test or the equivalent test with 95% of significance. Kruskal – Wallis test followed by Dunn's when necessary.

Results: Jussara supplementation in TJ maternal diet increased expression the UCP1 in 21-day-old offspring (TJ vs C; $p < 0.05$), reduced carcass lipid (TJ and CJ vs C; $p < 0.05$) and prevented the reduced of carcass protein content (T vs TJ and C; $p < 0.01$). Weight relative RET was lower in CJ in relation to C ($p < 0.05$) and no observed difference in BAT between the groups. Weight in 21-day-old was lower in CJ in relation to another groups ($p < 0.05$).

Conclusion: The jussara supplementation in maternal diet improved body composition and increased the protein expression of UCP1 in 21-day-old offspring. It is suggesting enhanced of thermogenic capacity with jussara supplementation showing a possible treatment to obesity process.

Browning of WAT – BMP4 induces a beige metabolic profile independent of UCP1

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Background & Aims: Browning of white adipose tissue (WAT) has a potential to decrease obesity due to an increased metabolic activity. The increased metabolic activity is in brown adipose tissue mediated by the mitochondrial protein Uncoupling Protein 1 (UCP1) that dissipates the proton gradient normally used to produce energy. However, the link between UCP1 and metabolic activity is not as clear in so called beige adipocytes, i.e. WAT-derived adipocytes differentiated with pharmacological agents to become brown-like. A clarification of this link could potentially lead to new ways to treat obesity.

Objectives: The objective was to unravel the relation between different measures of browning. With this knowledge, we are able to propose key experiments for assessment of browning. Specifically, we have been studying rosiglitazone, known to induce browning, and compared to the less known agent Bone Morphogenic Protein 4 (BMP4) to unravel different mechanisms of browning of adipocytes.

Material & Methods: WAT-derived adipocytes was treated with rosiglitazone [1] or BMP4 during differentiation. We performed functional and metabolic assessments of the cells, i.e. measures of UCP1 on both mRNA and protein levels, as well as mitochondrial stress tests assessing the rate of oxygen consumption during different mitochondrial stimulations/inhibitions. The data was analyzed using a new fit-for-purpose mathematical model for mitochondrial dynamics.

Results: The adipocytes treated with BMP4 contained little or no UCP1 protein. We tested different hypotheses of the found increased metabolic activity using the mathematical model combined with targeted experiments. We found that uncoupling was present in the BMP4-treated cells, but that the mechanism of uncoupling was independent of UCP1.

Conclusion: We have found that BMP4 induces a state that shares the metabolic and morphological profile of rosiglitazone-induced beige adipocytes, but independent of UCP1. This insight thus opens the door to a new field of research regarding browning of WAT in the treatment of obesity and metabolic disease.

Reference:

1 Bartesaghi, S., et al., Thermogenic activity of UCP1 in human white fat-derived beige adipocytes. *Mol Endocrinol*, 2015. 29(1): p. 130–9.

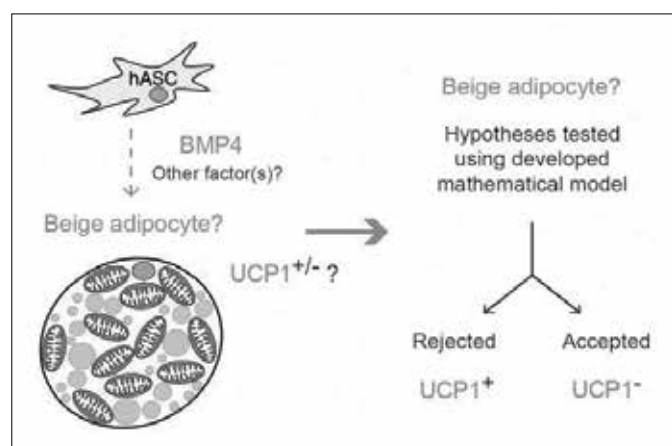


Fig. 1. Mathematical modeling to unravel mechanisms of UCP1 independent browning with BMP4

PO1.039

A combined bioinformatics study of murine brown and white adipose tissues based on microarray expression data

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Background: Brown adipocyte tissue (BAT) has recently gained increased research attention for its specific molecular characterization and potential ability to fight obesity. The purpose of this study is to identify differentially expressed genes (DEGs) and biological processes between BAT and white adipocyte tissue (WAT).

Methods: We performed a combined study of gene expression data using publicly available microarray Gene Expression Omnibus (GEO) series. Raw gene expression data were pre-processed by the affy package, after which DEGs between BAT and WAT were screened using the limma package in R language. Protein interactions among the DEGs were calculated with String software, and a protein-protein interaction (PPI) network was visualized using Cytoscape. Functional analyses were performed to identify enriched gene ontology (GO) categories and pathways using the DAVID online tool. Finally biological process GO terms were summarized and visualized as a graph and treemap with REVIGO.

Results: we identified 333 consistent DEGs between BAT and WAT across four available series (GSE8044, GSE10246, GSE19757 and GSE67389, adjusted p-value < 0.05, fold change ≥ 2 or ≤ 0.5). Of which, SDHB, IDH3A, IDH3B, ACO2, CS, DLAT, FH1, SUCLA2 and SUCLG1, may play important roles in the functions of BAT because they played roles in multiple biological processes GO terms. Functional enrichment analysis suggested that ubiquinone biosynthesis and myofibril assembly specifically occurred in BAT. Pathway analysis revealed that genes over-represented in BAT were also consistently enriched in pathway of oxidative phosphorylation and some neurodegenerative diseases (Parkinson's disease, Alzheimer's disease, Huntington's disease) across the four series.

Conclusions: Our present analyses suggest a core set of genes and biological processes that may be involved in the different phenotypes and functions of BAT and WAT.

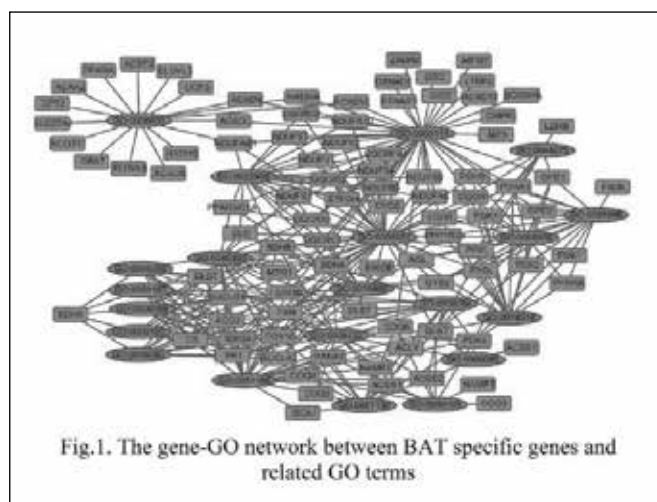


Fig.1. The gene-GO network between BAT specific genes and related GO terms

PO1.040

Leptin within the subphysiological to physiological range improves male reproductive function

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Objectives: Conflicting evidence concerning the role of leptin in male reproduction has been published. Furthermore, dose-dependent effects of leptin on Leydig cell function and spermatogenesis have not been studied.

Methods: Leptin-deficient obese (ob/ob) male mice were treated with subphysiological leptin doses, i.e. doses not sufficient to normalize body weight (BW; 0.1 and 0.5 mg/kg BW/d) and physiological doses, i.e. doses sufficient to normalize BW (3.0 mg/kg BW/d) or saline for 12 weeks starting at 8 weeks of age. The effect of leptin on testicular weight, parameters of spermatogenesis, and testosterone biosynthesis was elucidated.

Results: Mean testis weight increased significantly in the 0.1 mg/kg BW/d group (95.1 mg) and the 3.0 mg/kg BW/d group (92.4 mg) as compared to control mice (86.5 mg) (both P < 0.05). Intratesticular testosterone relative to testis weight significantly increased in the 0.5 mg/kg BW/d group (491.5 ng/g) as compared to control mice (279.5 ng/g; P < 0.05). Both mRNA and protein expression of the steroidogenic enzyme cytochrome P450-17A1 were significantly up-regulated by leptin treatment. Furthermore, spermatogenesis improved in leptin-treated animals with significant more seminiferous tubuli in stages I-VIII (controls: 41.6% versus 3.0 mg/kg BW/d group: 87.2%; P < 0.01), as well as less abnormal seminiferous tubuli structure (controls: 37.6% versus 3.0 mg/kg BW/d group: 2.0%; P < 0.01).

Conclusions: Leptin administration within the subphysiological to physiological range improves reproductive function via improved Leydig cell function with increased intratesticular testosterone levels, as well as an improved spermatogenesis with less abnormal tubuli.

Impact of aging on adiposity and blood pressure after sleeve gastrectomy in diet-induced obese rats

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Introduction: Aging and obesity are two conditions related to an increased risk of cardiovascular disease.

Objective: Our aim was to analyse whether an advanced age affects the decrease in body weight, adiposity and blood pressure after sleeve gastrectomy in an experimental model of diet-induced obesity (DIO).

Methods: Young (6-months-old) and old (18-months-old) male Wistar DIO rats (n = 101) were subjected to surgical (sham operation and sleeve gastrectomy) or dietary interventions [pair-fed to the amount of food eaten by sleeve-gastrectomized animals]. Systolic (SBP), diastolic (DBP), and mean (MBP) blood pressure values and heart rate (HR) were recorded in conscious, resting animals by non-invasive tail-cuff plethysmography before and 4 weeks after surgical or dietary interventions.

Results: Aged rats showed higher (P < 0.05) body weight, subcutaneous and perirenal fat mass as well as mild cardiac hypertrophy. Sleeve gastrectomy induced a reduction in body weight, whole-body adiposity, and serum total ghrelin in both young and old DIO rats. The younger group achieved a higher excess weight loss than the older group (164 ± 60% vs. 82 ± 17%, P < 0.05). A significant (P < 0.05) decrease in insulin resistance, SBP, DBP, MBP and HR without changes in heart weight was observed after sleeve gastrectomy independently of age.

Conclusions: We herein show, for the first time, the effectiveness of sleeve gastrectomy without increased operative risk in body weight and blood pressure reduction even in aged animals via endocrine changes that go beyond the mere caloric restriction.

Correlation between vascular endothelial dysfunction and plasma leptin level in uncomplicated postmenopausal obese women

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Background: The mechanisms by which obesity increase the risk of atherosclerotic cardiovascular disease are poorly understood. In experimental models, leptin, a hormone produced by adipose tissue, has been shown adversely to affect vascular health. Therefore, our purpose was to examine if the increase of plasma leptin level was associated with Vascular Endothelial Dysfunction (VED) in uncomplicated postmenopausal obese women using analysis of endothelium-dependent vasodilation by radial artery pulse wave obtained through applanation tonometry.

Methods: The subjects included a group of 133 obese women (BMI ≥ 25) and another age-matched control group of 31 non-obese women (BMI: 18.5–22.9) of Asian origin. All uncomplicated post-menopausal obese women were sedentary (< 1hr/wk of physical activity). Anthropometric measurements were performed, and regional distribution of adipose tissue and metabolic variables including plasma concentrations of leptin were measured. Endothelial function was measured by pulse wave analysis after salbutamol administration, which reflects endothelium-mediated vasodilation, contributed partially by nitric oxide release

from β2-adrenergic stimulation. Radial artery wave forms were recorded and from a derived aortic waveforms augmentation index (AIx, defined as the pressure difference between the first and second peaks of the central arterial waveform, expressed as a percentage of the pulse pressure) was calculated.

Results: AIx fell significantly after the administration of salbutamol, which causes endothelium-dependent vasodilation. This value was significantly reduced in obese women compared with the controls (12.5 ± 6.8% vs 19.5 ± 7.5%, p < 0.001). Plasma leptin levels were correlated with VED (r = -0.311, P = 0.034). Leptin was a significant predictor of VED independent of BMI, percent body fat, visceral fat, fasting insulin (β = -0.390, P = 0.002).

Conclusion: Plasma leptin level was shown to be independently correlated with VED in uncomplicated obese postmenopausal women. In order to clarify the pathophysiologic link between leptin and VED, further clinical studies are needed.

Transcardial difference of adiponectin, interleukin-6 and tumor necrosis factor-α in overweight coronary artery disease patients

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Background: Obesity is associated with coronary artery disease (CAD), where epicardial adipose tissue (EAT) express proatherogenic cytokines (i.e., interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α)) and decreases production of beneficial adiponectin. Studies on endocrine role of EAT are mostly based on assessing cytokines' mRNAs, whereas cytokine blood levels might not readily correlate. In order to get better insight into the endocrine role of thickened EAT in CAD, we assessed transcardial difference of adiponectin, IL-6 and TNF-α.

Methods: We assessed anthropometric and ultrasound measures in cohort of fifty nondiabetic subjects (21 CAD and 29 non-CAD). Blood sampled from aortic root and coronary sinus was assayed for adiponectin, IL-6 and TNF-α, using ELISA.

Results: Except thicker EAT in CAD subjects, anthropometric measures were similar (overweight), with higher adiponectin in coronary sinus than in aortic root (p < 0.001) in both groups. CAD subjects had lower adiponectin in aortic root (p < 0.001) and higher levels of TNF-α in coronary sinus than in aortic root (p = 0.05). EAT thickness positively correlated with hip circumference (p = 0.038) and negatively correlated with adiponectin levels (for both p < 0.05).

Conclusions: Secretion of adiponectin from EAT in non-CAD and CAD overweight subjects was similar, while latter had lower systemic adiponectin level and thicker EAT. EAT with thickening reaches the threshold level of near-maximal down-regulation of adiponectin and its further thickening is not associated with continued decrease of adiponectin production. In CAD patients levels of TNF-α were higher, but IL-6 were not, indicating the both cytokines might be flush out by lymphatic route.

Adipose Tissue Inhibits Proteoglycan Synthesis in Cruciate Ligament

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Obesity is characterised by an expansion of white adipose tissue mass that can lead to adverse health effects including joint disease and osteoarthritis.

tis. Adipose tissue contains adipocytes which synthesise and release an array of inflammatory cytokines and growth factors. Cranial cruciate ligament (CCL) rupture is one of the most important causes of lameness in dogs and morbidity in comparative species such as man. However, the role of adipose tissue in CCL has not yet been clarified. In order to examine the role that adipose tissues play in the normal biology of the CCL and also in pathogenesis of CCL disease, we examined alterations of proteoglycan in ligament explants after co-culture with infrapatellar fat pad (IPFP) and subcutaneous (SC) fat. Specimens of CCL, IPFP and SC fat were obtained from 6 dog cadavers without any musculoskeletal disease. These explants were weighed before culture for 14 days in Dulbecco's Modified Eagle's medium supplemented with fetal bovine serum and antibiotic/antimycotic. Tissue explants were allocated to five groups (CCL, IPFP, CCL+IPFP, SC, CCL+SC), meaning 6 samples from each animal per group. Media were collected and changed every 48 hrs. Both media and tissues on day 14 were harvested and performed glycosaminoglycan (GAG) assay. Compared with CCL tissue cultured alone ($8.87 \pm 4.20 \mu\text{g}/\text{mg}$), GAG concentrations were minimal in both types of adipose tissue (IPFP $1.00 \pm 2.12 \mu\text{g}/\text{mg}$; SC $0.26 \pm 0.47 \mu\text{g}/\text{mg}$). GAG concentration was also significantly less in both CCL+IPFP ($5.66 \pm 2.60 \mu\text{g}/\text{mg}$) and CCL+SC ($6.39 \pm 2.82 \mu\text{g}/\text{mg}$) samples than in CCL tissue cultured alone (Figure 1). Similar results were obtained when GAG concentrations were measured in the media from each co-culture (Figure 2, $P < 0.01$). Taken together, these findings suggest that adipose tissue may secrete factors which decrease proteoglycan in cruciate ligament by reducing glycosaminoglycan synthesis and secretion. However, the significance of this biological effect is not known, and additional experiments are required so as better to understand this interaction.

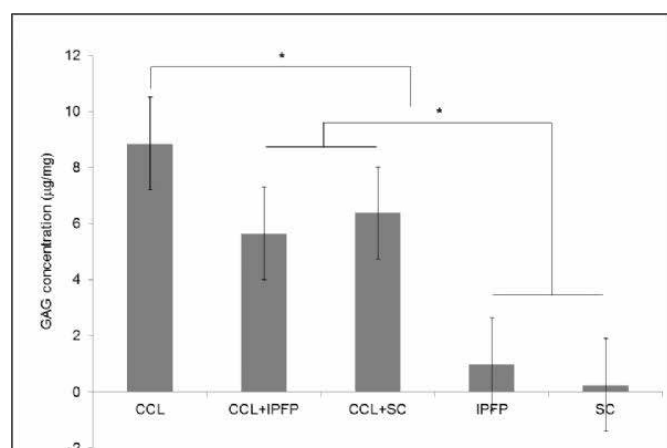


Fig. 1. GAG levels in different groups of explants.

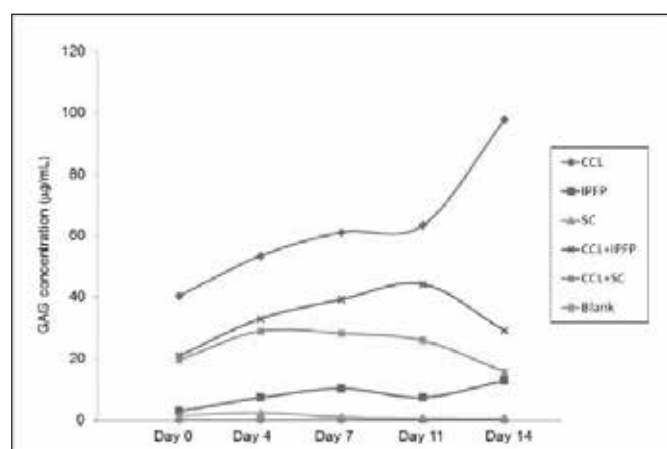


Fig. 2. GAG levels in culture media on Day 0 – Day 14.

PO1.045

The cross-talk of lipopolysaccharide-binding protein between obesity and liver diseases

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Background: Lipopolysaccharide-binding protein (LBP) is a hepatokine mainly from liver cells and has been reported to be associated with non-alcoholic fatty liver disease, obesity or metabolic diseases. Since chronic hepatitis C virus (HCV) infection causes dyslipidemia, the aim of this study was to determine serum LBP level in subjects with or without HCV infection and correlate its level with body mass index (BMI) and the severity of fatty liver.

Methods: We recruited 128 HCV infections from a community-based population and 120 non-HCV infections from the metabolic clinic. Basic information, clinical data, LBP and abdominal ultrasonography were collected.

Results: No matter in non-HCV or HCV infections groups, LBP serum level was increased when BMI was higher with p -value < 0.05 . Besides, LBP serum level was increased as long as fatty liver become severer with p -value < 0.05 . In non-HCV infections, LBP was only correlated with waist circumference in multivariate linear regression analyses. However, LBP was positive associated with age, ALT, high severity of fatty liver and HCV-RNA viral load in HCV infections. In logistic regression model, no matter in non-HCV infections or HCV infections groups when excluding the factor of hs-CRP, high severity of fatty liver still revealed significant association with LBP and BMI with p -value < 0.05 .

Conclusions: LBP is one of hepatokines and positive associated with BMI, high severity of fatty liver and HCV-RNA viral load. LBP may be a promising biomarker between obesity, fatty liver and HCV infections. More investigations need to be performed to clarify its mechanism of the causal relationship between LBP and obesity, fatty liver or HCV infections in the future.

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PO1.046

Interleukin-6 is important for long term cold induced thermogenesis in mice

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Interleukin-6 (IL6) is a cytokine important for inducing fever response during infection and has recently been shown to uphold core body temperature during acute cold exposure. Our aim of the current study was to investigate if IL6 also is important for thermogenesis following a long term cold exposure in mice. Experiments were done with global IL6 deficient (-/-) mice, mice with conditional IL6 receptor α (IL6Ra) knockdown in brain (IL6Ra NesCre) and appropriate wild type controls. All mice were placed in cold environment (4°C) for 6 days. Core body temperature and oxygen consumption was measured by telemetry probes and indirect calorimetry at room temperature (20°C) at baseline and on the first day and the last day of cold exposure. The animals were killed directly following the last measurement and tissues were dissected and kept in -80°C until analyzed for mRNA expression. The body temperature and oxygen con-

sumption in IL6^{-/-} and IL6Rα NesCre mice did not differ from the wild type mice in room temperature or during the first day of cold exposure. However, after 6 days in 4°C the IL6^{-/-} mice had significantly lower body temperature and lower oxygen consumption compared to wild type mice. The IL6Rα NesCre mice had also lower body temperature than the controls during the last day of cold exposure. Furthermore, an increase in the mRNA levels of brain-derived neurotrophic factor (Bdnf), was found in the brain stem of both IL6^{-/-} and IL6Rα NesCre mice compared to wild type mice. The finding that body temperature was decreased in IL6^{-/-} and IL6Rα NesCre mice indicates a decrease in thermogenesis in these animals. In line with this, Bdnf which was increased in brain stem of IL6^{-/-} and IL6Rα NesCre mice, has previously been shown to mediate induction of hypothermia. These results suggest that IL6 is not only involved in body temperature regulation during infection, but also contributes to long-term cold induced thermogenesis, probably through mechanisms in the CNS.

PO1.047

Autophagy contributes to macrophage lipid handling: Potential relevance to adipose tissue dysfunction in obesity

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Background and Aims: Obesity increases the population of lipid-laden adipose tissue macrophages (ATM foam cells, AT-FC), which were shown to induce insulin resistance in adipose tissue. Autophagy, an evolutionarily-conserved house-keeping process, has recently been implicated in cellular lipid handling, feeding and/or degrading lipid droplets (LD). However, its role in ATM lipid handling is unknown.

Material/Methods: We followed autophagosome and LD dynamics (formation and degradation/disappearance rates) in RAW264.7 macrophages with CYTO-ID (an autophagosome fluorophore) and BODIPY (neutral-lipid dye), respectively, using a live-cell semi-automatic system. For initial LD biogenesis rate, cells were pre-treated with autophagosome formation or degradation inhibitors (3-methyladenine, bafilomycin-A1, chloroquine or leupeptin), followed by lipid loading with 0.2 mM oleic acid (OA) and BODIPY. Complementarily, using a pulse-chase concept, LD degradation was assessed in autophagy-manipulated foam cells.

Results: Effective inhibition of autophagosome degradation required six hours incubation with bafilomycin-A1 and chloroquine (increased autophagosomes area) and two hours for 3-methyladenine (decreased autophagosomes area). The initial rate of LD biogenesis with OA was 4.9 ± 0.57 LD/cell/h. Inhibition of autophagosomes degradation with either bafilomycin-A1, chloroquine or leupeptin increased the initial rate to 7.6 ± 0.76 , 7.0 ± 0.77 and 6.2 ± 0.64 LD/cell/h, respectively ($P < 0.05$ for all). Surprisingly, inhibition of autophagosomes formation using 3-methyladenine reduced LD biogenesis rate to 1.8 ± 0.08 LD/cell/h ($P < 0.05$). In FC the rate of LD degradation upon OA removal was 0.28 LD/cell/h. Although the effect of neither autophagosomes degradation nor formation was significant, bafilomycin-A1 and chloroquine tended to enhance LD clearance to 0.34 LD/cell/h ($P < 0.11$).

Conclusion: Our results propose a role of autophagy in LD dynamics such, that autophagy inhibition might increase ATM lipid accumulation, thereby supporting FC biogenesis. "Funding:" Israel Science Foundation (ISF); Deutsche Forschungsgemeinschaft (DFG)

PO1.048

Stem Cells isolated from adipose tissue of obese subjects show different methylation patterns that might compromise their biological functions

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Background & Aims: Adult adipose tissue contains a pool of abundant multipotent stem cells, designated as adipose-derived stem cells (ASCs) that are able to replicate as undifferentiated cells, and to develop as mature adipocytes. Available information indicates that ASCs are important players in the metabolic dynamics of the adipose tissue (AT) participating in the development of obesity and related comorbidities. We have proved that AT from obese individuals contains a dysfunctional population of human ASCs (hASCs). In this sense, we hypothesize that the hostile environment associated with obesity (as inflammation and hypoxia) could be the underlying cause of the defective properties of AT-resident stem cells through epigenetic modifications.

Material/Methods: We isolated hASCs from subcutaneous (SAT) adipose tissue of lean (BMI 20–24.9 Kg/m²; N = 6) and obese (BMI 30–34.9 Kg/m²; N = 6) subjects. gDNA was extracted from all hASCs and its mature differentiated descendants. An Infinium Human Methylation 450 Bead Chip was performed for epigenome-wide association studies (a total of 4 comparisons were completed (Fig.1)). Gene expression of some affected genes were also validated by qPCR.

Results: Differentially DNA methylation profiles exist due to the obese environment in the hASCs niche (650 significant differentially methylated regions (DMR)) and these differences diminish in mature adipocytes (206 DMR). We showed that DNA methylation is quite static during the transition from stem to the fully mature adipocyte, and most of the differences observed are due to the obesity phenotype in the hASCs niche. Interestingly, most of these changes are located in transcribed regions, which have also been actively correlated with gene expression. Gene Ontology analysis revealed adipogenesis, inflammation and migration as the biological functions most significantly represented among the DMR identified in the hASCs niche.

Conclusion: Our study reveals that methylation status is significantly modified in an obese environment supporting hASCs dysfunction as a key regulatory event in obesity.

Acknowledgement: MINECO (PI14/00228, SAF2012–36186, PI15/00143) and CIBERDEM (CB07708/0012).

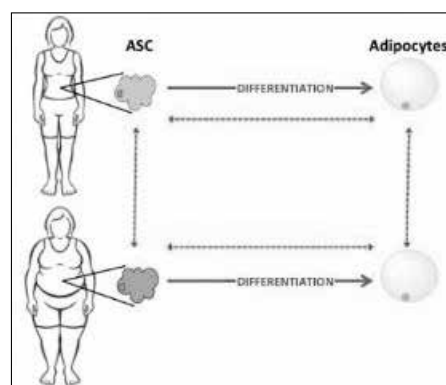


Fig. 1. Graphical approach of the 4 group of samples studied.

Relationships between different abdominal fat depots and bone health in inactive premenopausal females

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Background & Aims: Obesity is a key risk factor for poor cardiometabolic health, and yet has generally been considered to be protective against osteoporosis, due to increased mechanical loading. More recently, however it has been suggested that excess adipose tissue is detrimental to skeletal health. To address this question, the use of techniques which are able to distinguish between abdominal subcutaneous and visceral adipose tissue (SAT and VAT, respectively) is recommended (1). The aim of this study was therefore to assess whether different abdominal fat depots were associated with bone health in inactive premenopausal females, after adjustment for body weight.

Material & Methods: Single slice magnetic resonance imaging scans at L3/4 region were performed to measure SAT and VAT cross-sectional area in 19 premenopausal females (body mass index: 21.4–38.2 kg/m², age: 20–52 y). Quantitative ultrasound was used to measure Broadband Ultrasound Attenuation (BUA) of the heel. Data are presented as mean±SD, and Pearson Product Moment correlations were performed to test for associations amongst variables.

Results: SAT and VAT were 26.97 ± 17.65cm² and 7.15 ± 5.72cm², respectively and BUA for the left (L) and right (R) heels were 106 ± 12dB/MHz and 104 ± 19dB/MHz, respectively. BUA(L) was positively correlated with SAT, VAT and SAT+VAT ($r = 0.61$, $r = 0.53$, $r = 0.6$, respectively, $p < 0.05$) and BUA(R) was positively correlated with SAT ($r = 0.53$, $p < 0.05$) and SAT+VAT ($r = 0.46$, $p < 0.05$). However, when BUA(R) and BUA(L) were normalised to body weight to adjust for the effects of mechanical loading, both were significantly ($p < 0.001$) inversely associated with SAT ($r = -0.75$, -0.60 , respectively) and VAT ($r = -0.68$, $r = -0.52$, respectively).

Conclusion: Our findings suggest that abdominal adiposity exerts a negative influence upon calcaneal stiffness, a proxy measure for bone mineral density, after adjustment for mechanical loading. Although obesity has not traditionally been considered a risk factor for osteoporosis, factors such as adiposity-related inflammation may induce bone mineral loss. Further studies are required to test this hypothesis

Relationship of Broadband Ultrasound Attenuation (BUA) with abdominal adiposity measures in inactive premenopausal females when unadjusted for body weight (A, C) and when adjusted for body weight (B,D). SAT, Subcutaneous Adipose Tissue, VAT

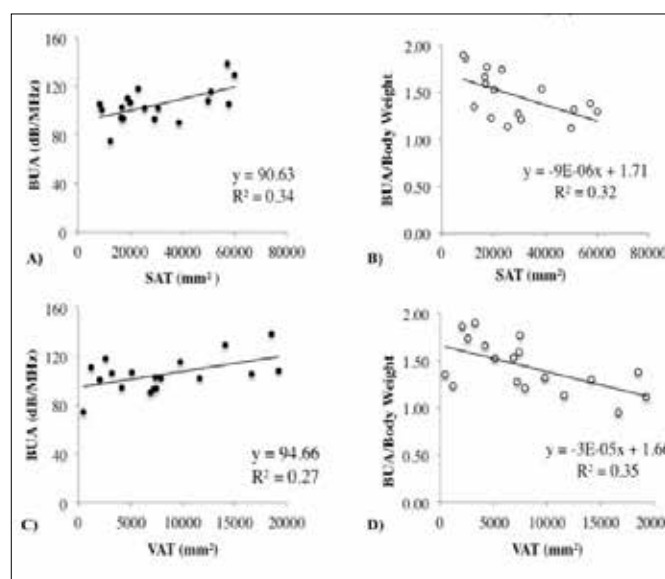


Fig. 1. Figure 1 illustrates that the relationships between unadjusted and adjusted BUA values (average right and left heels) with abdominal adiposity measures (SAT and VAT) are opposite. Whereas Figures A and C (unadjusted for body weight) illustrate positive associations between BUA and SAT and VAT, the opposite is reflected in Figures B and D (adjusted for body weight).

PO1.050

M1 phenotype polarization in macrophage after acute exercise is increased in lack to PPAR-γ

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Background: PPAR-γ is a key regulator of adipocyte metabolism and also has anti-inflammatory and anti-atherosclerotic properties. Acute and chronic exercise can favour anti-inflammatory response by augment IL-10 and IL-1ra production, by activation of PPAR-γ. However, the role of PPAR-γ after acute exercise is unknown.

Objective: To evaluate the time-dependent effect of acute exercise on macrophages polarization from conditional knockout mice stimulated or not with LPS.

Methods: Mice with conditional knockout of PPAR-gamma in myeloid cells (PPAR-γΔmac) and their control littermates (PPAR-γ(+/+)) were adapted on a treadmill and then submitted to a maximum speed test. After 72h resting, acute exercise session (1hour) of 60% maximum speed were performed and mice were euthanized two (n = 8) and 24 hours (n = 8) after the section and peritoneal macrophages were collected. Cytokine levels were measured by Enzyme-Linked Immunosorbent Assay (Elisa) from peritoneal macrophages cultured or not with LPS (2,5ug/mL).

Results: In the group non-exercise some pro-inflammatory cytokines (IL-6, TNF-α and IL-1β [only LPS]) presented higher levels in PPAR-γΔmac than their controls. MCP-1 and IL-10 were not significantly higher in PPAR-γΔmac. The response of IL-6 2h after exercise was modulated by LPS-stimulation, whereas in non-stimulated PPAR-γΔmac, IL-6 levels decrease ($p < 0.05$) and were maintained 24h later exercise. Conversely, PPAR-γ(+/+) had a peak on IL-6 secretion at 2h, but restoring its levels 24h post-exercise. IL-1β secretion was not modulated acutely (2h) by one exercise session, nonetheless in 24h PPAR-γΔmac rose more than 2 fold ($p < 0.01$), however, the LPS-stimulation was able to increase the PPAR-γ(+/+) 2h and 24h post-exercise. MCP-1 secretion had significant

increase in both genotypes ($p < 0.05$) only 24h after exercise in non-stimulated macrophages, but when LPS-stimulated the PPAR- γ Δ mac mice had a peak 2h post-exercise, decreasing 24h post-exercise. IL-10 was also higher 24h post exercise (both genotypes) in non-stimulated cultured, but the group PPAR- γ (+/+) presented increased secretion in 24h unlike PPAR- γ Δ mac which values were lower than 2h post-exercise.

Conclusion: One bout of moderate exercise seems to attenuate the production of pro-inflammatory cytokines by peritoneal macrophages, even as increase IL-10 secretion 24h post-exercise.

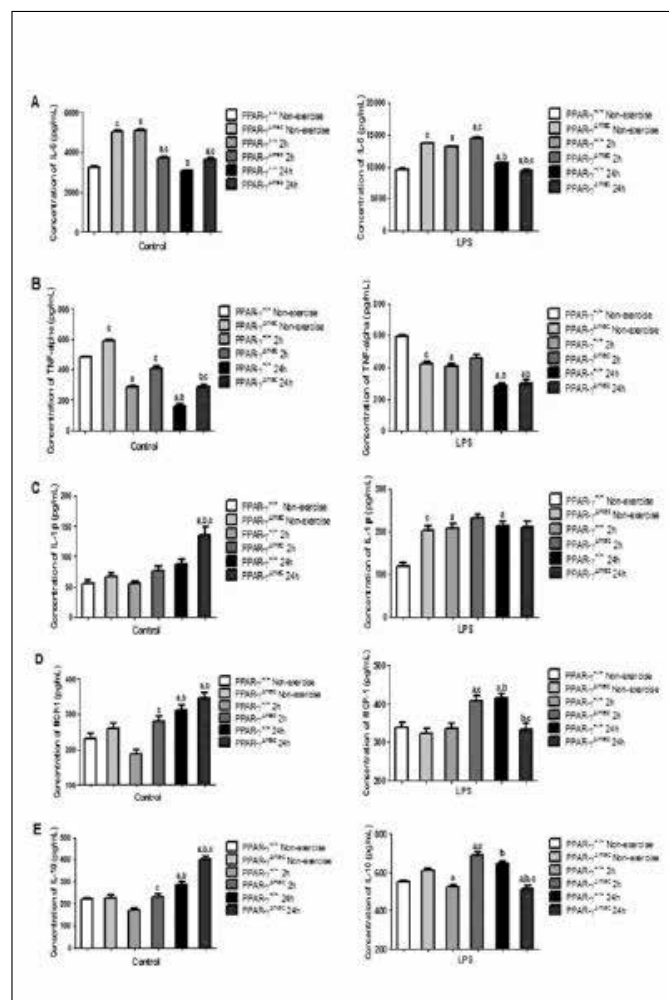


Fig. 1. Secretion of (A) interleukin 6 (IL-6), (B) tumor necrosis factor- α (TNF α), (C) interleukin- one beta (IL-1beta), (D) monocyte chemoattractant protein-1 (MCP-1) and (E) interleukin-10 (IL-10) in cultured peritoneal macrophages from PPAR- γ (+/+) and PPAR- γ Δ mac mice. Cells from the groups: non-exercise, 2h and 24h after one bout of moderate exercise protocol. Cells were cultured in 24-well dishes (5×10^5 cells/well) and stimulated with LPS (2.5 ng/ml) or not for 24h. The concentration of cytokines in the culture media was determined by ELISA. Data are presented as mean \pm SEM. a = different from control; b = different from 2h; c = different between genotype (One-way ANOVA followed by Bonferroni; $p < 0.05$).

PO1.051

Increased gene expression levels of lipocalin-2, chitinase-3 like-1, osteopontin and chemerin in peripheral mononuclear blood cells contribute to obesity-associated inflammation

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Introduction: Cytokines are critical effectors of the peripheral blood mononuclear cells (PBMC) function and their altered expression in obesity contributes to a chronic inflammatory condition associated with obesity-related comorbidities. The gene expression profile in PBMC has been suggested to reflect the visceral fat condition and to be representative of the inflammatory status in obesity. The aim of the present study was to evaluate the contribution of PBMC to the obesity-associated chronic inflammation analyzing the expression of novel adipokines.

Methods: In order to analyze the effect of obesity and type 2 diabetes (T2D) on the circulating and gene expression levels of novel inflammation-related adipokines, blood samples from 69 subjects [20 normoglycemic lean (LN), 24 normoglycemic obese (OB-NG) and 25 obese with T2D (OB-T2D)] were used in the study. Real-time PCR determinations were performed to quantify gene expression levels in PBMC of chemerin (RARRES2), chitinase-3-like protein 1 (CHI3L1), lipocalin-2 (NGAL) and osteopontin (SPP1) determining also by ELISA their circulating concentrations.

Results: We showed that PBMC gene expression levels of RARRES2 ($P < 0.0001$), CHI3L1 ($P = 0.010$), NGAL ($P < 0.0001$) and SPP1 ($P < 0.0001$) were strongly upregulated in obesity independently of the glycemic state. Circulating concentrations of these adipokines followed the same trend being significantly higher ($P < 0.05$) in OB-NG and OB-T2D patients compared to LN volunteers. We also identified a positive association between the gene expression levels of all adipokines analyzed with their corresponding circulating concentrations, except for SPP1.

Conclusion: These results provide evidence that alterations in inflammation-related adipokines are present in PBMC, which might contribute to the low-grade chronic inflammation that characterizes obesity. In this regard, PBMC constitute easily accessible and interesting markers reflecting obesity-related inflammatory events. 1. Conflict of Interest: The authors declare that they have no conflict of interest. 2. Funding: This work was supported by grants from the Fondo de Investigación Sanitaria-FED-ER, Instituto de Salud Carlos III (ISCIII) (PI12/00515, PI13/00460 and PI14/00950) and CIBERObn, Spain.

PO1.052

Validation of 16 recently identified BMI risk loci in a Singaporean Chinese childhood dataset

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Introduction: Obese children are likely to remain obese into adulthood and are predisposed to increased risks of disease. Recent studies have identified 103 adult obesity risk SNPs and studies among children of European ancestry have identified 6 additional childhood obesity SNPs. It is however, unclear if these findings are relevant to East-Asian childhood BMI levels.

Methods: 1,155 Singaporean Chinese childhood subjects from the Singapore Cohort study Of the Risk factors for Myopia (SCORM) were genotyped using the Illumina 550 SNP-chips and imputed for additional autosomal SNPs (1000genome reference panels). Coverage of 95 out of 109 BMI risk SNPs were available in the SCORM and selected for subsequent statistical analyses. BMI (kg/m²) measures when children were 9 years of age were used, to ensure maximal sample size and minimise pubertal effects of older paediatric age. Birth-weights were obtained from health booklets, completed by qualified professionals at birth. Linear regression analyses were performed using these quantitative traits and adjusted for sex.

Results: Our analysis revealed significant and directionally consistent associations for 16 BMI index SNPs (p-value between 0.049 – 0.001). A binomial test revealed significant over-representation of replicating loci in our childhood dataset (Binomial test p-value = 1.46x10⁻⁵). A gene-risk score, weighted on reported BMI effect sizes (wGRS), for these 16 index SNPs indicated strong associations with childhood BMI levels (p-value = 2.37x10⁻¹⁷) and explains 6.5% of childhood BMI variance, approximately 2-fold higher than in adults. The wGRS did not show an association with birth-weight (p-value = 0.760) and did not interact with birth-weight to modify childhood BMI (interaction p-value = 0.888). IPA canonical pathway analysis of all genes within an LD block (r² > 0.2) of these 16 replicating index SNPs implicated 3 pathways (NAD salvage pathway II, Neurotrophin/TRK signalling and GPCR-mediated integration of entero-endocrine signalling).

Conclusions: A significant proportion of adult BMI loci are associated with childhood BMI in the East-Asian Singaporean Chinese population. Furthermore these loci showed larger effects among childhood subjects and were independent of birth-weight.

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PO1.053

Metabolite signatures are associated with insulin resistance in childhood – a pilot study and longitudinal analysis of the EarlyBird cohort

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Background & Aims: Metabolite signatures are emerging as biomarkers of insulin resistance and type 2 diabetes. In particular, branched chain (BCAA) and aromatic amino acids (AAA) have been shown to be associated with insulin resistance and type 2 diabetes in adults. However, there is less data in children in whom insulin resistance is much more volatile, being particularly dependent upon pubertal timing as well as both changing body composition and physical activity. The aim of this pilot study was to ascertain whether metabolite signatures are associated with insulin resistance during childhood and adolescence.

Objectives: To determine the association between metabolite signatures and insulin resistance during childhood and adolescence, taking into account body composition, physical activity and pubertal timing.

Material & Methods: EarlyBird is a non-intervention prospective cohort study, which recruited a cohort of 300 healthy UK children and followed them up throughout childhood. Annual fasting serum samples from a sub-group of 40 children underwent metabolomic profiling by means of proton nuclear magnetic resonance spectroscopy. The subjects were chosen to represent the range of insulin resistance observed in the cohort at 5y and 14y. Mixed effects modelling was used to assess the association between insulin resistance (HOMA-IR) and individual metabolites, taking into account age, BMI sds, physical activity (accelerometry) and pubertal timing (age at peak height velocity – APHV).

Results: Insulin resistance was significantly higher in girls than boys (p = 0.035) and significantly associated with BMI sds (p < 0.001). There was

a decrease in insulin resistance up to around 8y, followed by an increase through puberty with this trend being dependent on pubertal timing (age*APHV interaction p = 0.027). Several metabolites including lipids and amino acids showed a significant association (p < 0.05) with insulin resistance independently of BMIsds, physical activity and pubertal timing. **Conclusion:** This pilot study has identified several metabolites which show an association with insulin resistance independently of adiposity, physical activity and pubertal timing in children from age 5y to 14y. These are novel insights into childhood metabolic health which warrant further investigation.

Funding disclosure: This research was funded by Nestle Institute of Health Sciences.

PO1.054

The effect of foot type on foot pressure characteristics in children with obesity

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Background & Aims: Flat-footed children with obesity suffer not only greatly from the excessive body mass, but also deformity of the foot structure. As a majority in all children with flat feet, the variations in dynamic plantar pressure distribution of flat-footed children with obesity have not been discussed in previous study.

Objective: The purpose of this comprehensive study was to describe the effect of different foot type (flat or normal) on dynamic plantar pressure distribution of children with obesity aged 7–14 years.

Material/Methods: Foot types of 551 children were classified by Foot Angle (FA) and Chippaux-Smirak Index (CSI). Foot pressure characteristics of 30 flat-footed children with obesity aged 7–14 years and another matched 30 normal-footed children with obesity were selected to be tested by footscan® plate system. Intergroup differences were analyzed by SPSS 17.0, p values less than 0.17 were perceived as significant in all statistical description.

Results: The peak pressure beneath the 2–5th toes was higher in the flat-footed children with obesity when compared to their counterparts. Flat-footed children with obesity displayed significantly higher pressure rate and greater contact area in the midfoot region. The force-time integral beneath the 2–5th toes and midfoot regions were significantly greater for the flat-footed children with obesity, while a decrease was found in the 5th metatarsals.

Conclusion: This study indicated increased contact area and impulse beneath the midfoot in flat-footed children with obesity, which leads to the decreased load in the metatarsals regions. Flat-footed children with obesity could be at an increased risk for midfoot injuries such as stress fractures.

Acknowledgement: The study obtained financial support from National Natural Science Foundation of China, grant number: 11502154.

PO1.055

Longer baseline telomeres are associated with a higher reduction in IL-6 levels during a weight loss program in obese adolescents. The EVASYON study

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Background & Aims: Telomere length (TL) is a biomarker for biological aging. Shorter telomeres predict accelerated aging and elevated risk for age-related diseases. But, the biomarker role of TL for predicting inflammation has not been elucidated yet. The aim of this study was to assess the association between TL and inflammatory markers after a 2-month weight-loss program in obese adolescents.

Methods: Leukocyte TL was measured by qPCR in 66 obese adolescents (12–17 years, 51% males) from the EVASYON program. Anthropometric and biochemical markers, as well as inflammatory cytokines, were analysed, and the individuals were also genotyped for the polymorphism -174G/C (rs1800795) in the IL-6 gene.

Results: Longer telomeres at baseline were associated with a higher reduction in IL-6 serum levels ($B = -1.03$, 95%CI: -2.01 to -0.05) after 2 months of the weight-loss treatment in multiple-adjusted models. The association between basal TL and changes in IL-6 was modified by the -174G/C polymorphism of IL6 gene (P interaction = 0.029). Therefore, individuals with the GG+GC genotype and with longer telomeres at the beginning of the program displayed a greater decrease in IL-6 levels than CC homozygotes.

Conclusion: Longer telomeres could be beneficial for ameliorating inflammation after a weight-loss program in obese adolescents. Furthermore, the -174G/C polymorphism in the IL-6 gene may have an important role modulating the relationship between TL and IL-6.

Acknowledgements: Research relating to this work was funded by grants for the EVASYON project (FIS; PI051579, PI051080); PIUNA (University of Navarra)); Carlos III Health Institute (CB06/03/1017), and RETICS network; and the Spanish Ministry (SAF2010–20367, SAF2013–49088-R). The FPU fellowship to García-Calzón is gratefully acknowledged.

PO1.056

Foot pressure characteristics of Chinese overweight and obese children during gait

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Background & Aims: Previous studies indicated that excessive and repetitive loads can lead to a high risk of developing foot injuries and pathologies. There are studies showing that different races and customs may lead to the diversity of plantar pressure.

Objective: This is the first study to evaluate foot pressure characteristics of overweight children, not only obese children in China, which can provide the pressure patterns of Mongoloid obese children with data references.

Material/Methods: Totally 354 children (176 boys and 178 girls) aged 7–16 years without pathology were recruited from China. According to the body mass index, all subjects were classified into groups of normal (159), overweight (66) and obesity (129). Data of plantar pressures was collected by Footscan® Plate System. Intergroup differences were analyzed by SPSS 17.0, p values less than 0.17 were perceived as significant in all statistical description.

Results: Overweight children displayed significantly higher peak pressures and force-time integrals beneath the 4th metatarsal, midfoot and heel regions relative to normal children ($p < 0.017$). Interestingly, elevated force-time integrals, pressure-time integrals and contact areas of obese children were found at hallux and toes2–5 regions when compared to normal counterparts ($p < 0.017$). Pressure rates were higher in obese children beneath the metatarsals and midfoot regions ($p < 0.017$). Overweight and obese children displayed much greater foot flat phase than the normal children ($p < 0.05$).

Conclusion: Since significant higher pressures at the hallux for obese children were found for the first time, we theorize that races and customs may affect the biomechanical function of the hallux or alter the walking habits of obese children rather than the skeletal structural changes responsible for this finding. Overweight and obese children could be at an increased risk for metatarsals and midfoot injuries.

Acknowledgement: The study obtained financial support from National Natural Science Foundation of China, grant number: 11502154.

PO1.057

Inside out the rag bag of glucose intolerance in obese caucasian adolescents

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Background: Prevalence of impaired glucose tolerance (IGT) is raising among obese adolescents in parallel with epidemic obesity. In some cases, IGT reverts to normal glucose tolerance (NGT) by the end of puberty.

Objectives: To investigate metabolic factors predicting the IGT reversal to NGT and verify whether preserved β cell glucose sensitivity (β CGS) is protective against persistent IGT.

Methods: 2 year-cohort study of 150 severe obese adolescents evaluated by 5-point oral glucose tolerance testing at baseline and at follow-up with measurement of glucose, insulin and c-peptide to estimate several empirical parameters of insulin sensitivity and secretion.

Results: After 2 years, 113 (73.8%) patients remained NGT, 9 IGT (5.9%) and 28 (18.3%) reverted to NGT. At multivariable models, change of loge β CGS was inversely associated with time-related change of logeG120, with (Model 2) and without (Model 1) correction for the change of logeOGIS. The model 2 was more strongly associated with the change of logeG120.

Conclusions: A relatively greater β CGS and, to a minor extent, a greater insulin sensitivity at the beginning of the pubertal transition were associated with lower concentrations of 2 hour plasma glucose at the follow-up and explained reversal of IGT to NGT.

PO1.058

Can Maternal Characteristics and Birth Weight Affect Body Weight in Preschool Children?

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Background & Aims: Childhood obesity is a global public health issue and its prevalence has increased dramatically throughout the last decade. It has been suggested that there is a relationship between low or high birth

weight, maternal characteristics (maternal age, educational level, occupation) and childhood obesity. The objective of this study was to investigate the effects of maternal characteristics and birth weight on preschool children's body weight.

Material & Methods: This study conducted on 450 children (46% boys and 54% girls) between 3–6 years old. Personal data for the children and mothers were collected by means of a questionnaire and anthropometric measurements were taken by researchers. WHO Anthro Plus programme was used to calculate and assessment the measurements. Birth weight were classified as low birth weight (LBW) (< 2500 g) and high birth weight (HBW) (> 4000 g). Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, Version 22.0).

Results: The mean age of the children was 4.9 ± 1.1 years. The mean birth weight of children was 3189.6 ± 572.3 g. According to birth weight classification, the ratio of LBW was 14.0% and HBW was 6.9%. In this study 38.2% of mothers (major rate of the study) were graduated from the university, while 62.7% of them were not working. According to BMI-for-age-Z-score (BAZ), underweight children were 16.7%, while the overweight/obese children were 30%. There was a positive and significant correlation between birth weight and body weight of children ($r = 0.131$; $p < 0.05$). Also, there was found differences between maternal educational level and body weight and height for age-Z-scores. However, there was no relationship between body weight and other maternal characteristics ($p > 0.05$).

Conclusion: As a result, the child's birth weight and maternal educational level were found to have an impact on body weight. For this reason, it is considered that healthy nutrition awareness in pregnancy is an important point for mothers and their children's later periods of life.

PO1.059

Sugar-sweetened beverage consumption is associated with hepatic fat independently of energy intake in overweight children; preliminary findings of the EFIGRO study

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Background: Consumption of sugar-sweetened beverages has increased in the last few years. The intake of these artificial drinks has been associated with obesity in children. Hepatic steatosis is one of the most adverse outcomes related to an excess of adiposity in children.

Objective: To examine the association between sugar-sweetened beverage consumption and dietary sugar intake with hepatic fat content.

Methods: This study includes 70 overweight (IOTF criteria) children (50% girls) aged 9 to 12 from Vitoria-Gasteiz. Dietary intake was evaluated as the means of two non-consecutive 24h-recalls assessed by nutritionists and analysed by Easy-Diet computer program. Hepatic fat content was measured by magnetic resonance imaging. Hepatic steatosis was considered as a liver fat accumulation above 4.85%. Regression analyses were used to examine the associations of sugar-sweetened beverages intake with hepatic fat content as dependent variable adjusted by age, sex, dietary energy intake and cohort. ANCOVA was used to compare sugar-sweetened beverage intake between groups with and without hepatic steatosis.

Results: Sugar-sweetened beverage intake was significantly associated with hepatic fat content regardless of energy intake ($\beta = 0.266$; $P = 0.026$). The intake of sugar-sweetened beverages was significantly higher in children with hepatic steatosis comparing with those without hepatic steatosis (150.1 ± 40.5 g vs. 48.8 ± 24.1 g, respectively, adjusted $P = 0.006$). In contrast, there was not found any significant association between total sugar dietary intake and hepatic fat content.

Conclusions: These results suggest that sugar-sweetened beverages intake may increase the accumulation of fat in the liver of overweight children. This study provides further evidence for targeting the reduction of sugar-sweetened beverages intake in healthy lifestyle intervention programs for children.

Acknowledgements: The EFIGRO study was supported by the Spanish Ministry of Economy and Competitiveness, "Fondos de Investigación Sanitaria del Instituto de Salud Carlos III" (PI13/01335), "Fondos Estructurales de la Unión Europea (FED-ER)", "Una manera de hacer Europa", and by the University of the Basque Country (GIU14/21). Trial registration: NCT02258126

Reference:

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PO1.061

Effect of age on detailed body composition and resting energy expenditure changes in normal weight, overweight and obese children and adolescents

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Background: Compared with adults, children have a higher resting energy expenditure (REE) relative to their body weight ((REE)/BW). The decline in REE in childhood and adolescent may be due to changes in body composition (fat free mass (FFM) and fat mass (FM)) or to changes in individual organ masses.

Objectives: We intended to compare the impact of age on detailed body composition and REE/BW ratio in normal weight, overweight and obese children and adolescent.

Methods: 263 normal weight (mean BMI 18.4 kg/m²) and 158 overweight and obese (mean BMI 30.3 kg/m²) children and adolescent aged 6–18y were investigated. FFM and FM were measured by air-displacement plethysmography together with whole body magnetic resonance imaging to assess high metabolic rate organs (brain, liver, kidney, heart and spleen). REE was adjusted for FFM and total organ masses (OM) by using a regression analysis. FFM-index (FFMI; (FFM/height m²)) and OM-index (OMI; (OM/height m²)) were calculated.

Results: In normal weight group, there were significant associations between age and FM, FFM, all organ masses, OM/FFM, FFMI, OMI, REE-adjusted FFM and OM and REEadjusted FFM and OM/BW. In overweight and obese group, significant correlations were observed between age and FM, FFM, all organ masses except brain ($P = 0.227$), OM/FFM, FFMI, REEadjusted FFM and OM and REEadjusted FFM and OM/BW. In a multiple stepwise regression analysis, height explained 60.9% and 52.6% of the variance in REE in normal weight and obese individuals respectively. Additionally, gender (5.6%), kidneys (2.4%), age (1.7%), heart (1.3%) and liver (0.7%) improved the model in normal weight group whereas gender (8.7%), liver (7.9%), FM (1.7%), age (1.1%), and spleen (1.1%) increased the explained variance in REE in overweight and obese group.

Conclusion: The decline in REE during growth is likely due to a decrease in the proportion of some of the more metabolically active organs.

PO1.062

Analyses of leptin, its soluble receptor, and free leptin index in children treated for obesity

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Leptin concentrations are known to reflect the degree of fat mass and changes herein. Also soluble leptin receptor (SLR) concentrations and the free leptin index (FLI) are related to the degree of fat mass and changes herein, but less is known in regards to the ability to predict changes in weight.

Objectives: To identify markers related to the leptin system that at baseline is able to identify changes in the degree of obesity.

Material & Methods: Weight, height, and blood samples analysed for leptin and SLR concentrations were measured in 249 boys and 318 girls (aged 3- to 22-years) at baseline and after weight changes during childhood obesity treatment. FLI was calculated as leptin/SLR*100.

Results: At baseline the median BMI SDS was 3.09 (1.33–5.54) in boys and 2.76 (1.35–5.65) in girls. Reductions in leptin ($p < 0.0001$) and FLI ($p < 0.0001$) and increases in SLR ($p = 0.002$) concentrations were seen during weight loss. In those gaining weight, concentrations of leptin ($p < 0.0001$) increased and SLR ($p = 0.01$) and FLI ($p = 0.03$) decreased. However, neither leptin ($p = 0.43$), SLR ($p = 0.52$), nor FLI ($p = 0.26$) could predict alterations in BMI SDS adjusted for sex, age, and baseline degree of obesity.

Conclusions: Leptin, SLR, and FLI were related to the degree of obesity at baseline and changes hereafter, but adjusted baseline concentrations were not able to predict subsequent changes in weight, suggesting that the leptin system rather reflect than orchestrate changes in obesity.

PO1.063

Maternal obesity, gestational weight gain and diabetes affect maternal but not foetal lipid profile

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Adequate supply of fatty acids (FAs) to the foetus influences the foetus growth and is pivotal for the delivery of healthy, full-term newborn. Aim of the present study was to explore the relationship between maternal and foetus lipid profile and to evaluate whether specific pregnancy conditions which alter fatty acid metabolism (obesity, excessive weight gain, GWG, or diabetes) are associated with specific changes in maternal or foetal lipid profile that can affect pregnancy outcomes and offspring risk of obesity. Erythrocytes FAs profile was estimated gas-liquid chromatography on normal weight or overweight/obese 460 mothers (18–45 years old) and their offspring (cord-blood, 237 males), at birth from the “Feeding Low-Grade Inflammation and Insulin Resistance of The Foetus” study. Significant differences were found between maternal and foetal profiles in total saturated FAs ($p = 0.02$), stearic acid (18:0), arachidic acid (20:0, $p = 0.0001$), behenic acid (22:0, $p = 0.007$); in the ratio between saturated and unsaturated ($p = 0.0001$), in monounsaturated FAs and some polyunsaturated FAs (i.e. linoleic acid, $p = 0.0001$; alpha-linoleic acid $p = 0.0001$, arachidonic $p = 0.0001$; for both concentration and percentage; dihomo-gamma-linolenic (DGLA) acid: $p = 0.0139$ and n-3 eicosatrienoic acid $p = 0.013$; eicosapentanoic $p = 0.004$ and docosapentanoic: $p = 0.0001$). Our findings also confirmed the phenomena of docosapentanoic (DHA) “bioattenuation” and “biomagnification”. Pre-pregnant body mass index was negatively associated with maternal essential FAs, while GWG was positively and negatively associated with maternal DGLA and DHA, respectively. In diabetic pregnancies, a significant lower concentration of trans-palmitoleic acid was observed. No significant association between increasing pre-pregnant BMI, GWG or maternal diabetes was detected with foetal lipid profile. Our findings show that maternal pre-pregnancy BMI, GWG or diabetes could affect maternal, but not foetal, lipid profile. The latter is directly dependent to maternal erythrocytes fatty acids composition.

PO1.064

Prevention of obesity and cardiovascular risk factors by sports intervention and nutrition training- The EDDY Study

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The prevalence of overweight and obesity in children and adolescents in European countries ranges from 5% to 25%. In Vienna approximately 23% of the adolescents are overweight or obese. The WHO 2020 Guidelines call for a reduction of overweight and obesity in children by 10% and in adolescents by 5% until 2020. Therefore a swift implementation of concepts which combat obesity and prevent its origin is necessary. The EDDY project is an interventional cohort study with a cohort of 147 participants, scaled in an intervention group and a control group. The intervention group received a comprehensive, age-appropriate nutrition and sports intervention, as well as a physiological training. Before and after intervention and at two follow-ups, subjects were physically measured (BIA, height) and blood samples were taken to determine the metabolic status. In addition, knowledge of nutritional issues and eating habits as well as psychological parameters were measured with adequate questionnaires. Nutritional knowledge improved by around 7% after intervention compared to the beginning of intervention. In addition the consumption of junk food, sweets and salty snacks was reduced significantly after intervention. The body fat percentage of the subjects in the intervention group was reduced in a nonsignificant extent after intervention, as well as the number of children with elevated LDL and total cholesterol values. The data indicate that an intervention based on nutrition knowledge and stimulating daily physical activities is able to improve the nutrition habits and possibly the health status. It turned out that the involvement of parents and teachers is an important factor for the success of intervention.

PO1.065

Is there any relationship between sleep duration and obesity in toddler/preschool-aged children?

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Background & Aims: The prevalence of early childhood obesity has increased dramatically worldwide over the past years. That is a serious concern because being overweight or obese in childhood carries into adulthood. Many studies indicate that short or long sleep may play a role in obesity risk. The aim of this study was to evaluate relationship between sleep duration and obesity in toddler and preschool-aged children.

Material & Methods: This study was conducted with 547 (291 girls, 256 boys) toddler/preschool children between 2–6 years living in Ankara-Turkey. WHO Anthro Plus programme was used to calculate body mass index-for-age z-score. Normal daily total sleep duration was defined according to age groups (2, 3–4, 5–6 years old; 13, 12, 11 hours respectively) and below/above of these hours defined as short or long sleep duration. Eight hours or less of nighttime sleep duration was defined as ‘short sleep’. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, Version 22.0).

Results: The mean age of children was 4.7 ± 1.12 years. Children's mean daily sleep duration and mean nighttime sleep duration were 10.9 ± 1.57 , 9.7 ± 1.40 hours respectively. It was found that 54.8% of children were below the recommended daily sleep duration according to age groups and 18.3% of children had short nighttime sleep duration. It was determined that 19.7% of children were underweight and 17.2% of children were overweight/obese. As a result of the study, it was not found a significant relationship between nighttime sleep duration, total sleep duration and body weight ($p > 0.05$).

Conclusion: In present study, the majority of children were in normal body weight that could be a factor in the lack of relationship between sleep duration and body weight. As a result, we recommend that children get ad-

equate amounts of sleep in a regular pattern. Furthermore, experimental studies in early childhood are needed to clarify the potential mechanisms that may explain the association between sleep and weight management.

PO1.066

Left ventricular hypertrophy and left ventricular geometry in obese children

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Background & Aims: Obesity-related left ventricular remodeling are present in obese children, providing a platform for early adult cardiovascular disorders.

Objectives. To investigate the frequency relationships between body mass index (BMI) and left ventricular mass index (LVMI), left ventricular (LV) geometry in children.

Material & Methods: We analyzed echocardiographic data of 120 10- to 18-year-old participants (48 female). Anthropometric indexes were measured. The BMI, LVMI and were determined. LV hypertrophy percentiles was defined as an LVMI percentiles of LVM/height^{2.7}, according to data from the Philip R. Khoury et al study.¹ A partition value of 0.42 was used for RWT [RWT = (IVS+PW)/LVEDD, where IVS is interventricular septum, PW is posterior wall, and LVEDD is left ventricular end-diastolic diameter]. LV geometry was considered normal if RWT was < 0.42 and LVMI was < 95 percentiles. A normal LVMI with increased RWT was denoted concentric remodeling, and a hypertrophic LV was denoted eccentric if the RWT was normal and concentric if the RWT was increased.

Results: Normal BMI children (n = 26): 50,0% — LVMI < 75 percentile (pct), 42,3% — LVMI 75–90 pct, 0% — LVMI 90–95 pct, 7,7% — LVMI > 95 pct (LVH). Overweight children (n = 27): 18,5%, 22%, 14,8%, 44,4% respectively. Obese children (n = 67): 6,0%, 17,9%, 17,9%, 58,2%. Chi-square = 44.36 (p < 0.0001), spearman rank correlation = 0.50 (p < 0.0001). Normal BMI children (n = 26): 73,1% normal LV geometry, 19,2% concentric remodeling LV, 0% concentric hypertrophy LV, 7,7% eccentric hypertrophy LV. Overweight children (n = 27): 33,3%, 7,4%, 22,2%, 37,0%. Obese children (n = 67): 20,9%, 3,0%, 14,9%, 61,2% respectively. Chi-square = 38.93 (p < 0.0001), spearman rank correlation = 0.47 (p < 0.0001).

Conclusion: In children BMI associated with early unfavorable cardiovascular phenotype characterized by increased LVMI and eccentric hypertrophy LV.

Reference:

1 Khoury PR, Mitsnefes M, Daniels SR, Kimball TR. Age-specific reference intervals for indexed left ventricular mass in children. *J Am Soc Echocardiogr.* 2009 Jun;22(6):709–14.

PO1.067

The association between vitamin D status and leptin in pregnancy

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Background: Fetal leptin has been found to predict fetal size and both neonatal size and adiposity. Therefore, investigation of modifiable maternal factors which reduce circulating leptin levels is required. Evidence for a relationship between leptin and 25-hydroxyvitamin D (25OHD) in pregnancy is inconclusive. We aimed to examine the association between maternal 25OHD and leptin during pregnancy and at birth.

Methods: This was an observational study of 295 pregnant women recruited in a maternity hospital in Dublin, Ireland. Serum 25OHD and serum leptin were measured in early pregnancy (13 weeks gestation), late pregnancy (28 weeks gestation) and in cord blood at birth.

Results: Serum 25OHD < 30 nmol/L (at risk of deficiency) was observed in 29.7%, 37.6% and 31.5% of early pregnancy, late pregnancy and cord samples. Serum 25OHD was inversely correlated with leptin at 28 weeks gestation (r = -0.153, P = 0.037) and at birth (r = -0.187, P = 0.020). On univariable analysis, leptin in the cord was significantly predicted by 25OHD in the cord (B = -0.0049, P = 0.037) and with a trend towards significance at 28 weeks gestation (B = -0.0049, P = 0.076).

Conclusion: Reduced serum 25OHD in late pregnancy and at birth were associated with increased leptin concentrations at birth. This is pertinent given the known association between leptin and adiposity in offspring, and suggests that maternal vitamin D status in pregnancy may be a mediating factor in future childhood obesity risk. These findings may be of particular importance due to the number of women classified as “at risk of vitamin D deficiency” in this cohort, and advocate routine antenatal vitamin D supplementation in Irish pregnant populations.

PO1.068

Self-perceived fatigue, physical performance and the relation with body composition in Flemish adolescents

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Background & Aim: Increasing numbers of school children are overweight or obese. These conditions are often related to increased caloric intake but also due to increased sedentary behaviour. It was shown that obese adolescents experienced higher levels of fatigue compared to normal weight peers. The aim of this study was to determine the effect of physical activity on self-perceived fatigue and the influence of body composition on these parameters.

Objectives: Obesity is linked with increased feelings of fatigue but is was never linked to body composition parameters. It seems that increased sport activity has beneficial influence on levels of fatigue but to high work load had an opposite effect.

Materials & Methods: 610 school+660 going children were assessed during physical education lessons for self-perceived fatigue (SpF), body composition parameters (BCP), activity level (AL) and physical performance (PP).

Results: Overweight (p < 0,05) and obese (p < 0,01) children showed higher levels of self-perceived fatigue (SpF) compared to under- and normal weights children. These levels of fatigue were related to physical performance, activity levels and body composition parameters. Being more physical active (sports and leisure activities) lowered SpF (r between -0,13 and -0,43; all p < 0,01) but children with higher work levels experienced higher general (r = 0,014; p < 0,01) and physical fatigue (r = 0,09; p < 0,05). Overweight and Obese children showed higher levels of work index compared to normal and under weight children (p < 0,01).

Conclusion: Sport and leisure time activities seemed to have a positive influence on SpF in pupils. Encouraging pupils to lower SpF would be favourable. Since higher work load was related with higher fatigue and fat mass in these children, school offering a technical and professional curriculum must be aware of this negative effect. Further research is necessary to verify whether school work or extra curriculum work has the higher impact on fatigue.

Ability of two estimation methods of body fat percentage in identifying unfavourable levels of biomarkers in adolescents – Results: From the LabMed Study

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Background/Aims: Adiposity has been associated with higher levels of a series of biomarkers of cardiometabolic risk in youngsters¹. We aimed to evaluate if two simple estimation methods of body fat percentage (BF%) could provide an overview of several inflammatory and metabolic biomarkers of a sample of apparently healthy adolescents.

Objectives: To assess and compare the ability of BF%, estimated by bio-electrical impedance analysis (BIA) and by the Slaughter et al.² equations for skinfolds thickness (SKF), in identifying unfavorable levels of several biomarkers of cardiometabolic risk in adolescents.

Material/Methods: This is a cross-sectional analysis from the LabMed study with 529 Portuguese adolescents (267 girls), aged 14.3 ± 1.7 years. BF% was estimated by BIA and by triceps and subscapular SKF (Slaughter et al.² equations considering sex and pubertal stage). Blood samples were taken to analyse high-sensitivity C-reactive protein (CRP), fibrinogen, erythrocyte sedimentation rate, complement factors C3 and C4, leptin and adiponectin levels. Receiver operating characteristic curves were used to explore the ability of the two methods to discriminate between low/high values of biomarkers.

Results: BF% estimated by both methods always showed higher areas under the curve (AUC) for each biomarker in girls than in boys (with the exception of BIA for leptin). BF% estimated by BIA and by SKF presented discriminatory ability in identifying unfavourable levels in all biomarkers of cardiometabolic risk in girls, however, BF% estimated by BIA displayed the highest AUC (except for CRP). In boys, BF% estimated by SKF presented higher AUC for CRP, fibrinogen and erythrocyte sedimentation rate; and BF% estimated by BIA for C3 and leptin.

Conclusions: Overall, diagnostic performance was more accurate in girls. BF% estimated by BIA presented better overall discriminatory ability for each biomarker than BF% estimated by SKF in girls, while in boys no method clearly prevailed over the other.

References:

- 1 Tam, C.S., et al. (2010). Obesity and low-grade inflammation: a paediatric perspective. *Obes Rev*, 11(2): 118–126.
- 2 Slaughter, M.H., et al. (1988). Skinfold equations for estimation of body fatness in children and youth. *Hum Biol*, 60(5): 709–23.

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Metabolic Syndrome in obese children and adolescents – influence of the degree of obesity, age gender and puberty

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Background: The Metabolic Syndrome (MetS) is well investigated in obese adults. Yet there is little known about the MetS and its individual traits in children and adolescents. The effect of the degree of obesity, age, gender and puberty are not well defined.

Objectives: To investigate the prevalence of MetS in children and adolescents and its relation to BMI-SDS and fat mass index (FMI).

Material/Methods: 421 children and adolescents aged 6–17 y [52.5% female; 14.1 (11.0 - 15.9) years; BMI-SDS: 0.60 (-0.40 - 2.06); FMI: 4.47 (2.36 - 10.18)] were investigated. 119 of them were obese [57.1% female; 15.1 (13.9 - 16.3) years; BMI-SDS 2.48 (2.20 - 2.83); FMI: 13.05 (11.14 - 15.02)]. Fat mass was measured by air displacement plethysmography. Blood pressure (BP), triglyceride (TG), HDL-C, insulin and fasting blood glucose (FBG) were included as parameters of MetS. IDF based cut-offs were used to detect MetS. Results: are presented as median and interquartile range. Multivariate linear regression analysis was used to determine the influence of BMI-SDS, FMI, age, gender and pubertal status on insulin concentration as a parameter of MetS.

Results: The prevalence of MetS was 24.9% in total population. Prevalences of MetS-related traits were 31% (BP), 10.4% (TG), 21.4% (HDL-C) and 12.1% (FBG). In a subsample of 119 obese children and adolescents prevalence of MetS was 68.9% [57.9% (BP), 20.5% (TG), 46.2% (HDL-C) and 10.3% (FBG)]. In the total population FMI significantly explained 21.3% of the variance of insulin concentration, age explained 1.1% and gender explained 0.8% of the variance. BMI-SDS and pubertal status were excluded from the model. For obese children and adolescents multivariate regression analysis showed no significant results.

Conclusion: MetS occurs in one in four children and adolescents. In obese subjects the prevalence raises up to almost 70%. In the total population FMI, age and gender affect MetS with no effects in obese subjects. Therefore the degree of obesity, age, gender and pubertal status do not influence MetS in obese children and adolescents. Acknowledgement: The study was funded by Omron and Competence Network Obesity, Core domain “Body composition” (FKZ 01GI1125).

Associations between the saliva microbiota and body size among adolescents

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The world is in the midst of an epidemic of obesity and the number of overweight and obese people worldwide has increased to 2.1 billion in 2013. Data from the Finnish Health in Teens Study (Fin-HIT, www.fin-hit.fi/for-researchers, N ≈ 11000), show that about 15% of 9–12-year-old Finnish adolescents are overweight and about 3% are obese. Overweight and obese children are likely to stay obese into adulthood and tend to develop diseases more frequently and at a younger age. Thus, early identification of persons at risk for developing obesity and prevention of overweight and obesity are of great importance. The aim of our study is to investigate the association between the saliva microbiota and body size and evaluate the microbiota as a potential obesity biomarker. Interactions between the saliva microbiota, dietary patterns and physical activity will be investigated. 16S rDNA (V3-V4 region) sequencing of 1000 randomly selected saliva samples from the Fin-HIT cohort have produced about 110 million 16S sequences. Identification of species (operational taxonomic units) and the diversity index have been calculated by the software package Mothur and comparison to the ribosomal RNA sequence database SILVA. An unadjusted association analyses between body mass index and the microbiota identified at least 8 bacterial species of significant interest. We will present an assessment of the microbial diversity in saliva samples and discuss the development of multivariable models for prediction of body size by integrating environmental factors, individual phenotypic, genetic and microbiota profiles.

Taking the Route Back: New Technologies for Overweight and Obesity Treatment in Childhood and Adolescence – Study Protocol

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Introduction and Objectives: Technology and increasing connectivity are changing the way of people consume, communicate and share information, and can be used as supplementary tool to optimize weight loss treatment. We aim to present the study protocol and the baseline sample characterization of a randomized controlled trial to examine the effectiveness and cost-effectiveness of a internet-based program intervention as supplementary tool for weight loss treatment in overweight and obese adolescents.

Methods: This study is a randomized controlled trial with two groups of overweight and obese adolescents undergoing treatment as usual (TAU) provided at the public Portuguese hospitals and health centers: an intervention group (IB-CBT) with access to the internet-based program for 9 months besides TAU, and a control group (TAU) that will have the usual intervention to overweight or obesity. In this study a total of 120 participants, aged between 13–18 years with BMI \geq 25 kg², need to be recruited and randomized to one of the two experimental conditions. All participants will be assessed at baseline, 3 and 6 months after the beginning of the research protocol, end of IB-CBT intervention, and at 6 and 12 months follow-up. The Internet-based program intervention for IB-CBT will be based on cognitive behavioral therapy. This is a 9 months two-phase program for weight loss and maintenance. Phase 1: weight loss through weight control, healthy eating and life-style strategies. Phase 2: weight maintenance through weight maintenance skills. Additionally an accelerometer will be used for each participant for 7 days to assess physical activity.

Conclusion: and Expected Results: We will present the baseline sample characterization regarding the variables under study (disorder eating behavior, intuitive eating, physical activity, body image and impulsivity). In the end of this study we expect to find different patterns of change of weight, eating related variables and levels of physical activity in participants from the two groups (ex: TAU vs IB-CBT) across the several assessment times, as also a higher cost-effectiveness on IB-CBT group. In an environment of limited resources, the recent development of new-technology based programs seems a promising area to deliver cost-effective interventions to a wide number of individuals.

Preliminary findings on the associations of sedentary behaviours with hepatic fat content and cardiometabolic risk factors in overweight children; the EFIGRO study

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Background: Nowadays children spend a considerable amount of the day using mobile-phones, watching television and playing videogames which increases sedentary time. Sedentary time is associated with cardiometabolic risk factors and obesity. Hepatic fat content is associated with an excess of adiposity.

Objectives: To examine the association of time using mobile-phone, television and videogames with liver fat content and cardiometabolic risk factors.

Material/Methods: A total of 48 overweight-obese (according to International Obesity Task Force criteria) children (52.1% boys) aged 9–12 were

included in the study. Hepatic fat (magnetic resonance imaging), total body fat (Dual-X-ray-absorptiometry) and fasting alanine aminotransferase (ALT), glucose, insulin and cholesterol were measured. The Physical Activity in Youth (YAP) self-reported questionnaire was used to evaluate time spent using mobile-phone, television and videogames (categorized as none, < 1 hour, \geq 1 hour).

Results: There were no significant differences in body mass index, percentage of obesity, body fat percent and insulin across mobile-phone time categories. However, the use of mobile-phone was associated with higher levels of hepatic fat (P = 0.069), ALT (P = 0.018), glucose (P = 0.042) and cholesterol (P = 0.023). In contrast, there were no significant differences in hepatic fat content and cardiometabolic risk factors across television and videogames time use categories.

Conclusion: The use of mobile-phone may increase hepatic fat content and cardiometabolic risk factors in overweight children. These results suggest that healthy lifestyle intervention strategies to reduce obesity-related diseases in children should include recommendations about reductions of sedentary behaviours such as mobile-phone-use.

Reference:

¹ Saint-Maurice PF, Welk GJ. J Med Int Res, 2014;16:e269. Medrano M et al., Contemp Clin Trials, 2015;45:346–355.

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Cross-sectional study for obesity, high blood pressure and urinary abnormalities in adolescents. Correct lifestyles or cure the disease

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Adiposity is considered a driving force for cardiovascular disease, it is examined whether high blood pressure was associated with body fat distribution and renal impairment (microalbuminuria and microscopic hematuria) in children and adolescents.

Objectives: PA correlate with BMI, waist circumference, urinary disturbances and lifestyles.

Materials/Methods: It has been enrolled 935 children, average age 9.48 (SD = 1.02) 9.52 median age (MIN 6.51 – MAX 12.05) years. For each participant, the researchers measured blood pressure, the body mass index (BMI), waist circumference (WC), urinalysis and a fresh collection of the questionnaire on the habits luxuries. The data were evaluated properly based on age and gender, with specific cut-off of growth.

Results: Male sex was independently associated with overweight / obesity: sex M, OR: 1.517, CI: 1163–1979, p < 0.01. In a logistic regression adjusted for age and sex, being in S/O presented an OR of 5.04 to present hypertension. Sex M (OR: 1.79, CI: 0543–2145, p: 12.46), age (for each year of age OR: 0.885, CI: 0638–1227, p: 12.46), S / O (OR: 5.041, CI: 2325–10931, p < 0.001). Being in S / O presented an OR of 3.47 to present a state of pre-hypertension. Sex M (OR: 1.038, CI: 0593–1816, p: 0.90), age (for each year of age OR: 1.391, CI: 1053–1850, p: 0.02), S / O (OR: 3.469, CI: 1943–6194, p < 0.001). Proteinuria / microalbuminuria appears to be significantly associated with hypertension and age. Sex M (OR: 0.708, CI: 0389–1290, p: 12.26), age (for each year of age OR: 1.884, CI: 1378–2576, p < 0.001), hypertension (OR: 4.946, CI: 1.838 - 13,314, p < 0.0). The resulting microscopic hematuria is weakly associated with hypertension and markedly with age. IA correlated in a logistic regression with abdominal obesity (OA) and not with the S / O. OA (OR: 3.720, CI: 1237–11188, p

< 0.02). No correlation between S/O and have a snack or breakfast, even with sedentary activities and sports (except at times extreme).

Conclusion: Clinical studies have shown that it is possible to prevent high blood pressure in adolescents prevention. But all health professionals need to work together to correct lifestyles

PO 1 – Health, Behaviour and Environment I

PO1.075

Is adiposity rebound a predictor of metabolically healthy obesity?

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A subset of obese individuals appears to be protected from cardio-metabolic disorders associated with obesity. They are known as metabolically healthy obese (MHO). As early adiposity rebound has been recognized as an important predictor of adult obesity we hypothesized that the distinction between metabolically healthy and unhealthy obese categories finds its origin in early growth. In order to identify early origins of adult MHO, we studied 4,378 members of the Northern Finland Birth Cohort 1966 (NFBC1966). At 31 years, they were categorized according to their BMI as obese, overweight or normal weight and in each group defined as metabolically healthy if they fulfilled 0 or 1 of the adverse cardio-metabolic criteria related to blood pressure, triglycerides, high density lipoprotein cholesterol, glucose, C-reactive protein and HOMA-IR and metabolically unhealthy if they fulfilled more than 1 criteria. We obtained six different groups. We used data from Child Health and Welfare Clinics to model their growth. In our study, 22.9% of the obese men and 37.3% of the obese women were metabolically healthy obese (MHO). Looking back in childhood, at adiposity rebound, MHO men had a greater BMI (16.6 ± 1.1 kg/m²) and were younger (4.8 ± 0.9 y) than the other metabolic groups. The differences with the other groups were significant except with MUO and remained the same after adjustment. In women, the MHO group had also the greatest BMI of all at adiposity rebound (16.4 ± 1.2 kg/m²), but was not the youngest group (4.6 ± 0.9 y), the MUO group being almost four months younger. The differences with the other groups were significant except for MUO and remained significant after adjustment. However, the difference in age at adiposity rebound between MHO and MUO became significant after adjustment. These findings support evidence that an early adiposity rebound predicts adult obesity. To our knowledge, this is the first study to show that a very early adiposity rebound with higher BMI might predict MHO in men but not in women.

PO1.076

Obesity and access to kidney transplantation in patients starting dialysis: A prospective population based cohort study

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Kidney transplantation improves survival and quality of life in obese patients with end-stage renal disease (ESRD). Few data exist on the impact of obesity on access to kidney transplantation. We characterized the relationships between BMI at the start of dialysis, the change in BMI, and either access to kidney transplantation or all-cause mortality among ESRD patients. Participants were 19524 dialysis patients with ESRD included in the French nationwide Renal Epidemiology and Information Network between 2002 and 2011. Patients' BMI were obtained at the start of dialysis and yearly. During a median follow-up of 20.3 months, 6634 patients underwent kidney transplantation. A BMI > 32 kg/m² at the start of the dialysis was associated with a lower likelihood of receiving a kidney transplant, which decreased even further with higher BMI values. For BMI ≥ 30 kg/m² at the start of the dialysis, a 1 kg/m² increase in BMI during follow-up was associated with a further 8–10% decrease in the likelihood of receiving a transplant. There was an L-shaped relationship between BMI at the start of dialysis and all-cause mortality. In conclusion, obese patients with ESRD face barriers to the receipt of a kidney transplant without valid reasons.

PO1.077

Associations of body size and adiposity with prostate cancer risk in the European Prospective Investigation into Cancer and Nutrition (EPIC)

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Background & Aims: Evidence on the association of body size and adiposity with prostate cancer risk is conflicting. We aimed to investigate the associations between anthropometric factors at baseline (body weight, body mass index (BMI), waist circumference (WC), hip circumference (HC), and waist-hip ratio (WHR)) and the risk of prostate cancer incidence, with a focus on tumour stage and grade, and on mortality from prostate cancer.

Material/Methods: A total of 142,239 men in 8 European countries of the European Prospective Investigation into Cancer and Nutrition (EPIC) participated. Associations were examined using Cox regression, using age as the underlying time variable, stratifying by recruitment centre and adjusting for education level, smoking, marital status, diabetes and physical activity.

Results: After an average of 14 years of follow-up there were 7,034 incident cases of prostate cancer, of which 936 were fatal. BMI, WC, HC and WHR were inversely related to total prostate cancer risk, while a higher risk for fatal prostate cancer was observed for every 5 kg/m² increase in BMI (hazard ratio (HR) = 1.15, 95% confidence interval (CI) = 1.03–1.29), every 10 kg increase in body weight (HR = 1.12, 95% CI = 1.05–1.20), and every 10 cm increase in WC (HR = 1.20, 95% CI = 1.10–1.30) and HC (HR = 1.25, 95% CI = 1.10–1.41). For incident disease, subgroup analyses showed significant heterogeneity for anthropometric measurements by cancer grade, with a significant positive association of body weight, WC and HC with risk for high-grade prostate cancer (Pheterogeneity all < 0.05). There was also evidence of heterogeneity by cancer stage (Pheterogeneity all < 0.05).

Conclusion: The results from this large prospective study suggest that higher BMI, weight, WC, and HC increase the risk of fatal and high-grade prostate cancer. This study shows that the association between body size and prostate cancer is complex and varies by disease subtype and aggressiveness. Acknowledgements: We thank all participants in the EPIC cohort for their contribution to the study.

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Childcare attendance influences childhood adiposity at 2 years: Analysis from the ROLO study

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Background: The first two years of life are instrumental for the physical development of every child. While the determinants of this are multifactorial, one reported consideration is the attendance of childcare and its associated effects. This study Aims: to investigate whether attendance of childcare pre-disposes a child to increased adiposity.

Methods: The data was collected as part of the ROLO study (Randomised cOntrol trial of LOw glycaemic index (GI) diet) at the National Maternity Hospital, Dublin, Ireland. Mothers were recruited antenatally and followed up at 2 years of age. Maternal and childhood anthropometric data and lifestyle questionnaires, reporting on childcare attendance and infant feeding practices, were collected.

Results: Anthropometric measures and lifestyle data was collected for 265 mother and children aged 2 years, 52.7% of which attended childcare. Measures of central adiposity; (abdominal circumference, waist: height ratio) and total adiposity measure (sum of all skin folds) were significantly elevated in the children attending childcare. After adjusting for the predictors (birth weight, gender, socioeconomic status, duration of breastfeeding, age at 2year exam and maternal BMI at 2years), the measures lost significance. However the B-value within the model (see table) indicates that childcare attendance was the strongest predictor for increased abdominal circumference, waist:height ratio and sum of all skinfolds. There was no difference in the infant feeding practices between the childcare groups.

Conclusions: Preliminary data from this cohort indicates that children who attend childcare have higher levels of total and central adiposity, however significance was not achieved after adjusting for cofounders. These results indicate a positive relationship between childcare attendance and adiposity. More extensive research is required to clarify the impact of childcare attendance and to tease out environmental effects on childhood obesity, with the hope of designing policies to address this issue.

Table 1. Associations of the different Anthropometric variables with Childcare attendance at 2 years.

Multiple linear regression analysis adjusting for the predictors; birth weight, gender, socioeconomic status, duration of breastfeeding, age at 2 year exam and maternal body mass index (BMI) at 2 years. Values were considered significant at $P < 0.05$

Effect of childcare attendance		Confidence Intervals	Confidence Intervals		
	B	Lower	Higher	P value	Adjusted R Square
Abdominal Circumference (cm)	1.126	-0.007	2.26	0.051	0.063
Thigh circumference (cm)	0.441	-0.45	1.331	0.330	0.023
Triceps Skin-folds (cm)	0.611	-0.219	1.441	0.148	0.013
Sum of Tri-scapular and sub-scapular skinfolds (cm)	0.719	-0.468	1.907	0.233	0.000
Sum of all Skinfolds (cm)	2.248	-0.167	4.663	0.068	0.040
Waist:height ratio	0.012	-0.001	0.025	0.075	0.038
Waist:Hip ratio	0.14	-0.007	0.035	0.196	0.000

PO1.079

Weight gain and changes in physical and mental health functioning: A follow-up study among ageing employees

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Background: Previous longitudinal studies suggest an association between weight gain and poor physical health functioning. However, the association with mental health functioning is less understood. This study aimed to examine whether weight gain among normal weight, overweight and obese female and male employees is associated with changes in physical and mental health functioning.

Methods: The Helsinki Health Study cohort includes 8 960 Finnish municipal employees aged 40–60 in 2000–2002 (phase 1, response rate 67%). Follow-up mail surveys were conducted in 2007 (phase 2) and in 2012 (phase 3). The final analyses included 4525 participants, of whom 82% were women. Participants were classified into six groups according to baseline body mass index (BMI) and weight gain between phase 1 and phase 2 (BMI increase $\geq 5\%$) in order to examine the change in health functioning among the different weight groups. The changes in physical and mental health functioning between phase 1 and phase 3 were measured with Short Form 36 Health Survey and analyzed with repeated-measures analysis. Covariates were age, living and employment status, drinking problems, smoking, physical activity, and self-reported diagnosed diseases.

Results: Weight gain was common among both women (34%) and men (25%). Compared to normal weight weight-maintainers the decline in physical health functioning among women was greater among obese weight-gainers (3.9 points, $p = 0.00$) than among obese weight-maintainers (1.7 points, $p = 0.01$). A greater decline was also seen among overweight (1.2 points, $p = 0.03$) and normal weight (1.4 points, $p = 0.00$) female weight-gainers, but not obese weight-maintainers. After adjustment

for all covariates the decline remained significant among obese and normal weight, but not overweight women. Also among men the decline was significantly greater among obese weight-gainers (3.8 points, $p = 0.02$) than among normal weight male weight-maintainers, even in the fully adjusted model. Among obese male weight-maintainers the decline was non-significant (1.6 points, $p = 0.21$). No differences between the weight groups were observed regarding the changes in mental health functioning.

Conclusions: Weight gain might increase the risk for poor physical health functioning among employees, especially women. Preventing weight gain likely helps maintaining good physical health functioning and work ability.

PO1.080

The FTO variant rs9939609 is associated with 5-year change in BMI, waist circumference and percent fat mass in children from 8 European countries

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¹⁰On behalf of the IDEFICS & I.Family consortia

Background: Using data from a European multi-centre study (IDEFICS) we have previously shown that the A allele of the rs9939609 FTO variant was significantly associated with higher values of body mass index (BMI), waist circumference and skinfolds, both cross-sectionally and longitudinally at 2 years follow-up (Lauria et al., 2012, PlosOne). The aim of these analyses was to confirm this result at 5-years follow-up, performed during the I.Family study.

Subjects & Methods: From the 4,405 children (age 2–9 years) from 8 European countries genotyped at baseline, 1,718 children (884 boys and 834 girls, age 7–16 years) had a complete dataset at 5-years follow-up. Information on socioeconomic status and on children's diet was collected from parents. Physical activity was assessed by accelerometry. Weight, height, waist circumference and skinfolds were measured at baseline and follow-up. Percent fat mass was calculated based on the Slaughter equation. BMI z-scores were calculated based on the IOTF dataset (Cole et al., 2012). Linear regression of, respectively, BMI z-score, waist circumference or percent fat mass on FTO status (AA/AT vs TT) was adjusted for age, sex, country and socioeconomic status, both cross-sectionally and longitudinally. Confounding by dietary variables (in terms of healthy diet scores, macronutrient composition and energy density) and for physical activity, as well as effect modification by these variables, were tested.

Results: & Conclusions: Cross-sectional analyses at follow-up confirm that the A allele of the rs9939609 variant of the FTO gene was positively associated with BMI z-scores, waist circumference and percent fat mass. Longitudinally, the FTO A allele was associated with changes in BMI z-scores, waist circumference and percent fat mass after 5-years follow-up. No effect modification by either diet or physical activity was found. Our results confirm that FTO may be involved in the regulation of body fat mass across child growth.

PO1.081

Do BMI trajectories from youth to adulthood predict adult metabolically healthy obesity?

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Background/Aims: Metabolically healthy obesity (MHO) refers to obese individuals who do not have the metabolic complications that are often associated with obesity, such as dyslipidemia, hypertension, and insulin resistance. MHO is more common at younger ages than older ages, possibly due to less exposure to obesity and less time to develop metabolic complications. This study aimed to examine if BMI trajectories from youth to adulthood differ between adults with MHO and metabolically unhealthy obesity (MUHO) and whether there is a critical age range where weight determines adult metabolic health.

Material/Methods: The Cardiovascular Risk in Young Finns study began in 1980 and has followed individuals at multiple time points from youth (3–18 years) to adulthood (24–49 years). Weight and height were measured at all follow-ups. In adulthood (2001, 2007 or 2011) MHO was defined as BMI $\geq 30 \text{ kg/m}^2$, normal fasting glucose ($< 5.6 \text{ mmol/L}$), triglycerides ($< 1.695 \text{ mmol/L}$), HDL cholesterol ($\geq 1.295 \text{ mmol/L}$ women, $\geq 1.036 \text{ mmol/L}$ men), and blood pressure ($< 130/85 \text{ mmHg}$). Multilevel mixed models, adjusted for age, sex and follow-up time, were used to compare BMI trajectories for adults with MHO and MUHO.

Results: Mean follow-up time was 29 (SD 3) years. Of the 588 individuals with obesity in adulthood, 74 (12.6%) were MHO. The BMI trajectories for MHO and MUHO individuals are shown in Figure 1. BMI in youth only differed at 9 years of age, where MHO individuals had a 1.1 kg/m^2 higher BMI than MUHO ($P = 0.017$). BMI was similar through adolescence and young adulthood. BMI trajectories diverged from age 33 to 49 with MHO individuals having at least a 0.7 kg/m^2 lower BMI than MUHO, significantly lower at 42 years (-1.7 kg/m^2 , $P = 0.007$).

Conclusions: Adult MHO was characterized by lower adult BMI, not youth BMI.

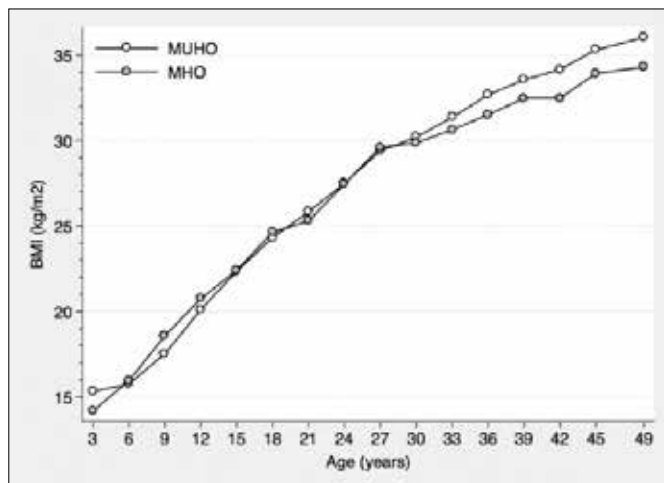


Fig. 1. BMI trajectories for MHO and MUHO individuals
BMI trajectories were similar through adolescence and young adulthood but diverged from age 33 to 49, with MHO individuals having a lower BMI than MUHO individuals.

PO1.082

Accumulation of adverse childhood events and overweight in childhood – A systematic review and meta-analysis

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Background: Adverse childhood events may play a role in the development of overweight. Adverse childhood events are defined in this study as events arising during childhood (not caused by medication) that can threaten the child's mental or physical well-being. Examples are parental divorce, illness or death of a family member and abuse.

Objective: To systematically review and pool all studies investigating the relation between accumulation of adverse events and measures of overweight in childhood (< 18 years).

Methods: A systematic search of MEDLINE, EMBASE, PsycINFO and CINAHL was performed to identify observational studies investigating the relation between accumulation of adverse childhood events and measures of overweight in children from the general population. Two authors independently determined eligibility of identified articles. Quality assessment was performed using the Newcastle-Ottawa Scale. Risk estimates of included studies were converted to odds ratios with 95% confidence intervals. A random-effects model was used to pool the odds ratios. Heterogeneity between study results was explored using subgroup analyses.

Results: The search identified 5402 articles of which 18 were included in the systematic review. These articles contained information on 16 distinct studies, including 5 with longitudinal results, 11 with cross-sectional results and 3 case-control studies. In the meta-analysis 12 studies could be included. All included studies investigated the relation between accumulation of adverse childhood events and either body mass index or overweight/obesity status in childhood. A significant positive association between accumulated adverse childhood events and childhood overweight measures was found in longitudinal studies (pooled OR (95%CI) = 1.12 (1.01–1.25), I² = 45.2%, $p = 0.104$) (Figure 2). The pooled result of cross-sectional studies was heterogeneous (I² = 62.6%, $p = 0.004$). Subgroup analyses showed the pooled estimate of studies assessing adverse childhood events in the past 0–2 years was not heterogeneous and not statistically significant (pooled OR (95%CI) = 1.23 (0.95–1.58), I² = 31.9%, $p = 0.196$).

Conclusion: A small positive association exists between accumulation of adverse events and overweight measures in childhood. Results indicate differences in overweight (measures) in response to adverse childhood events might take longer than 0–2 years to develop.

PO1.083

Identifying developmental trajectories of body mass index in childhood using latent class growth (mixture) modelling: Associations with dietary, sedentary and physical activity behaviors: A longitudinal study

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Background: To date, most epidemiologic studies examining associations between obesity and dietary and sedentary/physical activity behaviors have focused on assessing Body Mass Index (BMI) at one point in time. Recent developments in statistical techniques make it possible to study the potential heterogeneity in the development of BMI during childhood by identifying distinct subpopulations characterized by distinct developmental trajectories. Using Latent Class Growth (Mixture) Modelling (LC-GMM) techniques we aimed to identify BMI trajectories in childhood and to examine associations between these distinct trajectories and dietary, sedentary and physical activity behaviors.

Methods: This longitudinal study explored BMI SDS trajectories in a sample of 613 children from 4 to 12 years of age. In 2006, 2009 and 2012 information on children's health related behaviors was obtained by parental questionnaires, and children's height and weight were measured. Associations with behaviors were investigated with logistic regression models.

Results: We identified two BMI standard deviation score (SDS) trajectories; a decreasing BMI SDS trajectory ($n = 416$; 68%) and an increasing BMI SDS trajectory ($n = 197$; 32%). The increasing BMI SDS trajectory consisted of more participants of lower socio-economic status (SES) and of non-western ethnicity. Maternal overweight status was associated with being in the increasing BMI SDS trajectory at both baseline and follow-up six years later (2006: Odds Ratio (OR), 2.9; 95% confidence interval (CI) 1.9 to 4.3; 2012 OR, 1.8; 95% CI 1.2 to 2.6). The increasing BMI SDS trajectory was associated with the following behaviors; drinking sugared drinks > 3 glasses per day, participation in organized sports < 1 hour per week, and TV viewing > 2 hours per day, though participation in organized sports at follow-up was the only significant result.

Conclusions: Our results, as confirmed in other studies investigating developmental trajectories in childhood, indicate that maternal BMI is one of the most important risk factors for the development of overweight. Furthermore, comprehension of heterogeneity in the development of BMI and associations with modifiable health related behaviors is interesting for etiology and prevention, and may be helpful to identify high risk behaviors in high-risk groups and tailor interventions for children who are at higher risk.

PO1.084

Utility of of hypertriglyceridemic waist phenotype for predicting incident type 2 diabetes: The Isfahan Diabetes Prevention Study

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Background: In this study we evaluate the association between hypertriglyceridemic waist (HTGW) phenotype and the risks of type 2 diabetes (T2D) in an Iranian high-risk population.

Methods: We analysed 7-year follow-up data ($n = 1,869$) in non-diabetic first-degree relatives of consecutive patients with T2D 30–70 years old. The primary outcome was the diagnosis of T2D based on repeated oral

glucose tolerance tests. We used Cox proportional hazard models to estimate hazard ratio (HR) for incident T2D across four groups according to baseline fasting serum triglycerides (TG) level and waist circumference (WC): Normal WC and normal TG level, normal WC and high TG level, enlarged WC and normal TG level, and enlarge WS and high TG level. High TG level was defined as ≥ 150 mg/dl and enlarge WC was defined as ≥ 102 cm for men and ≥ 88 cm for women.

Results: The HTGW phenotype at baseline was associated with incidence of T2D, independently of age and gender. Those with enlarge WC and high TG level was over 20 times (OR 20.21; 95% CI 2.4, 170.4) and those with normal WC and high TG level 22.5 times (OR 22.5; 95% CI 3.0, 167.0) and those with enlarge WC but normal TG level were 25.4 times (OR 25.4; 95% CI 3.4, 187) more likely to develop T2D than those with normal WC and normal TG level.

Conclusions: These data provides further evidence that HTGW phenotype was a robust predictors of T2D in high-risk individuals in Iran. This tool could be useful for identifying individuals at high-risk of T2D.

PO1.085

Trends in overweight and obesity among Bulgarian children aged 1–4 years in 2004–2014

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Background & Aims: Overweight and obesity in early childhood represent a high priority in the national nutrition policy. The study Aims: to investigate the trends of overweight and obesity among young children during last decade in order to assess the effectiveness of implemented preventive strategies.

Objectives: To determine current prevalence of overweight and obesity among children aged 1–4 years and to evaluate their trends on the basis of results obtained in the previous 2 national surveys, undertaken in the last decade. **Material & methods** Prevalence of overweight and obesity among children 1–4 years of age was determined on a national representative sample in a survey carried out in 2014. Data were compared with results obtained for children in this age from national surveys conducted in 2004 and 2007. Height and weight were measured in all surveys; overweight and obesity were evaluated by BMI-for-age using WHO growth standards.

Results: In 2014 overweight prevalence among children aged 1–4 years was 3.2%, obesity was 5.1% with great difference among boys and girls (7.1% vs. 2.7%). The comparison with the results obtained in the surveys in 2004 and 2007(1, 2) indicate a trend for decreasing of overweight in children of both genders after 2007 (2004 – 9%, 2007– 8%). Obesity among girls was also decreased during this decade (2004– 5.4%, 2007– 2.9%, 2014– 2.7%), but obesity prevalence among boys has significantly increased (2004 – 3.3%, 2007 – 2.7%, 2014– 7.1%).

Conclusion: Recent data suggest that levels of early childhood overweight have decreased during last decade. There were determined opposite trends in obesity prevalence among boys and girls – decreasing in females and increasing in males that point to the necessity to investigate specific factors associated with gender difference in obesity trends.

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PO1.086

Sarcopenia for Male vs. Osteoporosis for Female: Synonym of Age-related Disease

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Introduction: We examined the prevalence of osteoporosis and sarcopenia, and the age- and gender-specific similarity or difference of prevalence between osteoporosis and sarcopenia based on the Korea National Health and Nutrition Examination Survey (KNHANES) IV data, nationally representative non-institutionalized civilians in Korea. We also investigated the gender-specific difference of vitamin D levels and quality of life according to the existence of osteoporosis and sarcopenia.

Methods: Through the KNHANES IV-V(2008–2010) program, the parameters of 7,095 subjects aged 50 years and over (3,252 men and 3,843 women) were analyzed. Sarcopenia was defined as appendicular skeletal muscle mass(ASM)/height(Ht)² below 2 standard deviation (SD) the sex-specific normal mean of a younger reference group. Osteoporosis is established by measurement of BMD by DXA of the spine and hip, and is defined as a BMD of 2.5 SDs below the peak bone mass of a young, healthy, gender- and race-matched reference population. Serum 25(OH) D concentration was measured by RIA using a γ -counter (1470 Wizard; PerkinElmer, Turku, Finland). The EuroQol-5 dimension (EQ-5D) was used to evaluate health-related quality of life.

Results: The prevalence of sarcopenia in men had a positive correlation with age (Pearson correlation coefficient = 0.309, $p < 0.001$) but in women had week positive correlation with age (0.034, $p = 0.033$), but the prevalence of osteoporosis in women had a positive correlation with age (0.487, $p < 0.001$) but in men had week positive correlation with age (0.027, $p < 0.001$). When we float the prevalence of sarcopenia and osteoporosis by sex, osteoporosis in women and sarcopenia in men showed similar trend and, osteoporosis in men and sarcopenia in women showed another similar trend. Men with sarcopenia and women with osteoporosis had significant lower vitamin D levels and EQ-5D index than men without sarcopenia and women without osteoporosis, respectively.

Conclusions: Our study showed osteoporosis in women and sarcopenia in men showed similar trend and, osteoporosis in men and sarcopenia in women showed another similar trend according to the age. Further prospective studies are needed in subjects showing sarcopenia in men to prevent and manage low vitamin D and poor quality of life.

PO1.087

The association between obesity and intra-ocular pressure in Korean adults

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Background: Obesity can be related to intraocular pressure in various mechanisms. We aimed to analyze the association between obesity and intraocular pressure in Korean adults.

Methods: We finally included 15382 men and women who participated in Korean National Health and Nutrition Examination Survey between 2010 and 2012. We defined the obesity status by body mass index (BMI) and waist circumference (WC). We analyzed the association between obesity and intraocular pressure.

Results: Intraocular pressure was significantly associated with BMI and WC in both men and women ($p < 0.001$ and $p < 0.001$ respectively). BMI ($\beta = 0.061$, $R^2 = 0.017$, $P < 0.001$ in men, $\beta = 0.054$, $R^2 = 0.015$, $P < 0.001$ in women) and WC ($\beta = 0.023$, $R^2 = 0.017$, $P < 0.001$ in men, $\beta = 0.023$, $R^2 = 0.016$, $P < 0.001$ in women) were proportional with intraocular pressure.

Conclusion: The obesity had the positive linear association with intraocular pressure in Korea adults.

Acknowledgement: No conflict of interest.

PO1.088

First year undergraduate weight change in a national multi-university study in England

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Background: Studies report that as students transfer from secondary school to university, there is a tendency to gain weight in their first university year. The phenomenon is called the Freshman 15 due to the perception that students gain on average 15lbs (6.8kg). However, North American studies have found a mean gain between 1 to 6kg while a meta-analysis found that weight gainers gained 3.38kg[1]. Limited research has been conducted on weight change in subgroups or in England. Further investigations to better understand the trends is important, especially in the context of rising obesity. Our aim was to conduct a large national study on first year university weight change in England.

Methods: We developed a short online survey aiming at recruiting first year students from 101 universities in England. There were three time points: academic year start, December and academic year end. Students reported their height, weight and demographics. We calculated absolute weight change, relative weight change and weight change rate of each student with complete data. We performed subgroup analyses within weight gainers and weight losers. T-tests were used to assess the significant difference and the effect of time, sex and baseline weight.

Results: The eligible sample was 215 students across 26 universities. The overall sample mean weight change between T1 and T3 (34 weeks) was 0.98kg (95%CI 0.49–1.47) at a rate of 0.029kg/week. The weight change rate was not different over the different periods. The rate for males (0.39kg/week) was not different to females (0.44kg/week). In the sample, 51% gained over 0.5kg while 25% lost more than 0.5kg. The mean weight change in weight gainers was 3.46kg and -3.21kg in weight losers.

Conclusion: Weight gain in university students continues to be a common phenomenon. Over 7–8 months, 50% of first year students were weight gainers with mean gains over 3kg while 25% were weight losers with mean loss over 3kg. It is important for universities to take steps towards helping students maintaining healthy weight.

Reference:

1 Vadeboncoeur et al. 2015. A meta-analysis of weight gain in first year university students: the case for the Freshman 15?. BMC Obesity,2:22.

PO1.089

Life-course Determinants of Childhood Obesity: The Urban Indian Scenario

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Objectives: The study investigates the hypothesis that pre-, peri- and postpartum risk factors have a causal effect on the risk of ‘unhealthy’ BMI at age 6 to 9 among Indian children. It also examines the relationship between cumulative risk score and overweight/obesity among urban children in India.

Methods: The study is a school-based, cross-sectional survey in an urban setting (New Delhi) of India. The sample size included 727 males with 730 females of metropolitan area and aged 6–9 years. As the study examines pre-, peri- and post-natal risk factors, focusing on critical periods and temporal relationships of these exposures in relation to development of obesity, life course health (LCH) model was used. Anthropometric measurements, life-style indicators, socio-economic status were measured and quantified with help of questionnaires. BMI was categorized used age- and

sex- specific percentiles, and treated as dichotomous variables to estimate risk of overweight/obesity. Exposure variables or risk factors are specific to pre-,peri- or post-partum periods. Lifestyle factors and maternal characteristics were adjusted for confounding effect. Cumulative risk was calculated to understand accumulation of risk factors. Descriptive and inferential statistical procedures were involved as data was analyzed using SPSS, 19.0.

Results: The results revealed among pre-natal factors for overweight or obesity status, adjusted odds ratio for presence of gestational complications was 2.11(95%CI 1.98–2.51) and that for smoking/drinking during gestation was 2.01(95%CI 1.34–2.47), and gestational weight gain > 16.0 Kgs during was accompanied with odds of 1.23(95%CI 1.11–2.02). Odds ratio for peri-natal factors was nearly 1.90 for cesarean section, and for the birth-weight categories, a U-shaped association was revealed with risk for obesity. The adjusted odds for predicting overweight/obesity by post-natal factors showed that breastfeeding has protective of about nearly 24%. On examining cumulative risk, children who scored ≥4 odds of being obese were nearly two times.

Conclusions: Estimation of risk of ‘unhealthy BMI’ reveals that pre-partum factors are relatively stronger predictors than peri- or post-partum exposures. We recommend that the policies should not only provide medical care during ante- and post-natal period but focus on course of life as a whole and intervene at sensitive periods to curb the obesity epidemic.

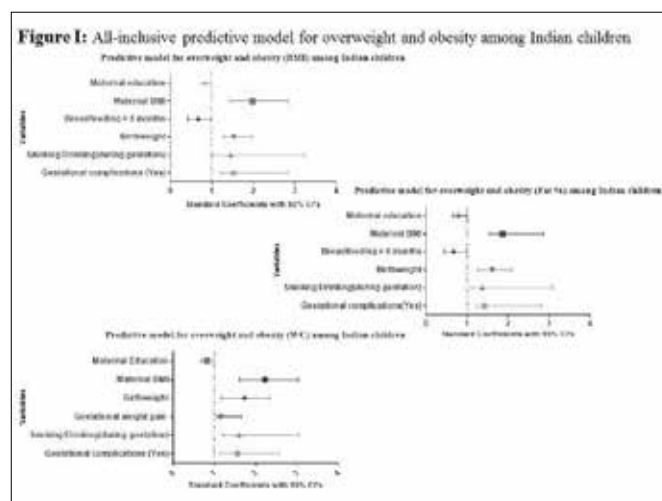


Fig. 1. All-inclusive predictive model for unhealthy BMI among Indian children All-inclusive predictive model (pre-, peri-, and post-natal factors) for overweight and obesity among Indian children

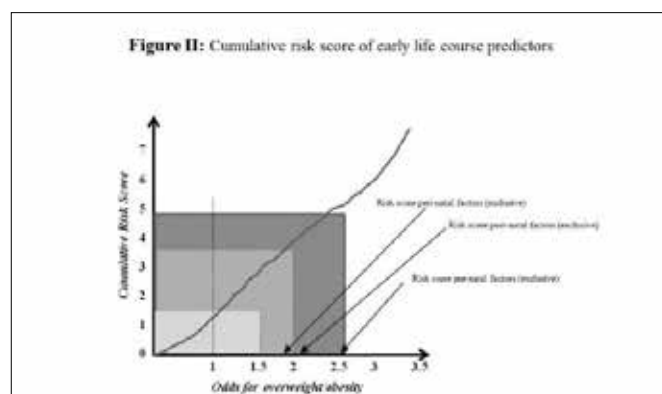


Fig. 2. Cumulative risk score of early life course predictors

Body Fat Percentage Assessed by Bioelectrical Impedance Analysis versus Standard Measures of Obesity: Relation to Future Cardiovascular Events

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Background: Cardiovascular disease (CVD) is a major public health burden. Gender differences in CVD are studied over the past decade to ameliorate early recognition of heart disease in women, which is more and more important in health care. Aim To prospectively determine the association of body fat percentage (%BF) by BIA with the development of CVD, compare this to other obesity measures and to study the dependency of BIA associations on gender and age.

Methods: This study was conducted among 6687 participants in the PREVENT cohort (49.8% males, 54 ± 12 years of age, BMI of 26.8 ± 3.8 kg/m² and waist circumference (WC) of 97.2 ± 11.1 cm). During the second screening (2001), various anthropometric and clinical parameters were obtained. A single frequency BIA device (Biostat Akern 101) was used to estimate %BF. Cox regression models were done separately for men and women comparing the highest versus the lowest tertiles. Results: During a mean \pm SD follow-up for 6.1 ± 1.2 years, 613 (9.2%) participants experienced a fatal or non-fatal CV event (436 male, 177 female). In total 49 BIA equations for the estimation of %BF were identified. The equation that best predicted future CVD was that by Van Loan and Mayclin (1) (HR_♂ [95%CI] = 1.17 (1.15–1.99) and HR_♀ = 1.20 (1.16–1.25) per unit increase). Male age-adjusted HRs (95%CI) for CV events are 1.86 (1.30–2.65), 1.52 (1.19–1.94), and 1.57 (1.07–2.29) for %BF (by Van Loan and Mayclin), BMI and WC, respectively. Female age-adjusted HRs were higher than in males: 3.96 (1.93–8.14) for %BF, 1.62 (1.08–2.43) for BMI and 1.99 (1.37–2.88) for WC. Subgroup analysis by age shows that every measured obesity marker better correlates with incident CVD in younger participants.

Conclusion: %BF estimated by BIA is independently associated with incident CV events. This association is stronger than BMI and waist circumference and stronger in women and younger subjects.

Reference:

1 Willett K, Jiang R, Lenart E, Spiegelman D, Willett W. Comparison of bioelectrical impedance and BMI in predicting obesity-related medical conditions. *Obesity* (Silver Spring). 2006;14(3):480–490.

MiR-199a as a novel adipogenic enhancer promotes adipogenesis in obesity

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Background: Obesity results from numerous, interacting genetic, behavioral, and physiological factors. Adipogenesis is partially regulated by several adipocyte-selective microRNAs (miRNAs) and transcription factors that regulate proliferation and differentiation of human adipose-derived mesenchymal stem cells (hMSCs-Ad). However, the molecular mechanisms underlying the missing link between miRNA and adipogenesis-related transcription factors remain elusive. Object: We hypothesized that specific miRNAs could be regulated by adipogenic differentiation in pediatric obesity.

Method: Expression of miRNAs in Plasma were evaluated by screening in 30 lean and obese children. miR-199a expression was quantified in cultured hMSCs-Ad after adipogenic treatment. Effects of miR-199a on adipocyte differentiation were studied following supplementing or depleting miR-199a in hMSCs-Ad.

Result: Results: showed that the levels of miR-15b, miR-126, miR-24, and miR-199a changed in adipose tissues from obese children. Among these miRNAs, miR-199a exhibited significant effects on increasing Lipid droplet formation. Furthermore, Lentivirus-mediated depression of the endogenous miR-199a markedly inhibited the expression of C/EBPα and FABP4, the two major transcription factors of adipogenesis in human mesenchymal stem cells.

Conclusion: In summary, we identified miR-199a as an regulated microRNA, which could play an important role for understanding the mechanism of the increase in visceral fat mass, which provides novel insights into the molecular mechanism of miRNA-mediated cellular differentiation.

Acknowledgments We thank Jian-xin WU (Department of Biochemistry, Capital Institute of Pediatrics, China) for critical reading and suggestions; Feng HE (Department of Molecular immunity, Capital Institute of Pediatrics, China) for analyzing the data and Ren-qiao TANG (Graduate School of Peking Union Medical College, China), Sheng-rong OUYANG (Department of Biochemistry, Capital Institute of Pediatrics, China) for technical support. Funding: This project was supported by grants from the Chinese Ministry of Science and Technology (2013CB530605) and from the National Science Foundation of China (81400365). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. Competing Interests: The authors have declared that no competing interests exist.

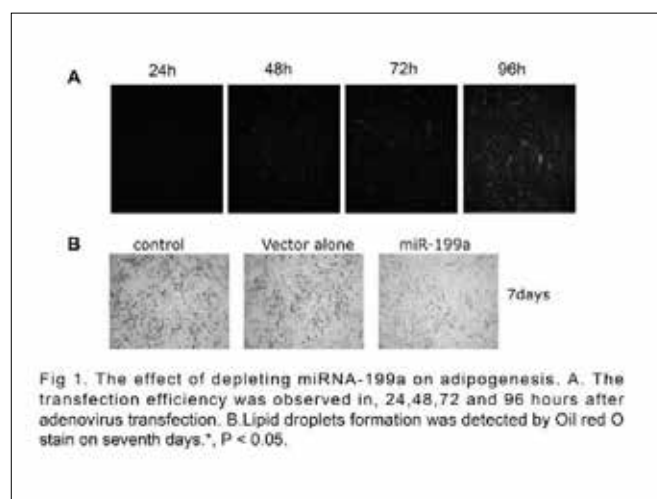


Fig. 1. The effect of depleting miRNA-199a on adipogenesis

Incidence of adult obesity as primary diagnosis in Northumbria, 2013–2015

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Background: There has been scarce research on incidence of obesity as primary diagnosis of all ages in literature. Therefore, the aim of the present study was to investigate and understand the incidence of obesity as primary diagnosis of all ages in the Northumbria region, located in the North-East of England, UK with higher deprivation level than in other English sub-regions but with a similar health profile to that in Denmark in the very recent years.

Methods: Hospital episode data in mid-2013 to mid-2015 covering 2 full calendar years was extracted from Northumbria Healthcare NHS Foundation Trust, covering Northumberland and North Tyneside, serving nearly half of a million population and free from the government control. Incidence estimation was using E66 following International Classification of Diseases 10th version and local annual population size, being calculated and presented with per 100,000 person-years by using Microsoft EXCEL.

Results: The overall incidence of adult obesity aged 20 and above as primary diagnosis in mid-2014 to mid-2015 was 2 per 100,000 person-years,

with 1.9 and 2.1 per 100,000 person-years in women and men, respectively. The overall incidence of adult obesity aged 20 and above as primary diagnosis in mid-2013 to mid-2014 was 2.5 per 100,000 person-years, with 4.2 and 0.5 per 100,000 person-years in women and men, respectively. Apparently, there has been an decrease in women but an increase in men. There were no cases in the very old men aged 80 and above but in the very old women, the incidence was 7 per 100,000 person-years.

Conclusion: For future research, investigating and publishing incidence of obesity as primary diagnosis of all ages from other geographic regions across the globe would be suggested. For clinical practice, re-allocation of medical, nursing and social resources to serve the local needs effectively might be encouraged.

PO1.093

Obesity, physical mobility and physical activity among elderly

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Background: Obesity in the elderly is a growing public health challenge. Aging is associated with changes in body composition and decreased metabolic rate, which can lead to an increase in body weight. In addition, impaired physical mobility is more common among the elderly than among younger people and can lead to physical inactivity. The aim was to examine how physical activity and physical mobility are related to obesity in the elderly.

Methods: A total of 2 558 men and women aged 65 years and older participated in a population survey in 2012 in Sweden with an overall response rate of 67%. Obesity (BMI ≥ 30 kg/m²) was based on self-reported weight and height and physical activity and physical mobility on questionnaire data. Chi squared test and multivariate logistic regression analysis were used in statistical analyses.

Results: The overall prevalence of obesity was 19% in women and 15% in men and decreased for those over 75 years. The main results showed a strong association between physical activity and obesity (OR: 1.63, 95% CI: 1.28–2.08) and even a stronger association between impaired physical mobility and obesity (OR: 2.83, 95% CI: 2.14 – 3.75) adjusted for gender, age, socioeconomic status and fruit and vegetable intake. Physical activity was, however, not associated with obesity among elderly with impaired physical mobility, but had a significant association among elderly with physical mobility.

Conclusion: It is important to focus on making it easier for the elderly with physical mobility to become or stay physically active whereas elderly with impaired physical mobility have a higher prevalence of obesity irrespective of physical activity.

PO1.094

Associations between early growth patterns and the risk for a metabolically unhealthy profile at 5 – 6 years of age

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Introduction: Children with increased metabolic risks have metabolically unhealthy (MU) profiles. Early growth patterns may contribute to the development of MU profiles.

Objective: To examine associations between early growth patterns and the risk for a MU profile at 5/6 years of age. Additionally, differences in associations were assessed for overweight and normal weight children.

Methods: 1,454 single term born children from the ABCD-study were included. Metabolic profile was based on accumulated z-scores of fasting glucose, high-density lipoprotein cholesterol, triglycerides and systol-

ic blood pressure (MU children z-score > 75 th percentile; metabolically healthy (MH) children ≤ 75 th percentile). Growth curves in BMI-SDS from 0–6 years were modeled with multiple measurements, general linear mixed model and post-hoc t-test analysis compared the BMI-SDS curve of MH and MU children. Stepwise logistic regression analysis examined associations between birth weight, accelerated growth (Δ BMI-SDS 0–6 months, 6–24 months and 2–5 years), BMI at 5/6 years and the risk for a MU profile. Additionally, interaction with weight status at age 5/6 years was examined.

Results: More MU children were overweight (16.0%) at 5/6 years of age than MH children (6.7%). Growth curves of the MH and MU children differed ($p < 0.001$): MU children had higher mean BMI-SDS from 2 years onwards (2 years Δ :0.106, $p = 0.019$, 6 years Δ :0.203, $p < 0.001$). Accelerated growth between 0–6 months (OR = 1.22;95%CI:1.07–1.40), 6–24 months (OR = 1.29;95%CI:1.03–1.60), 2–5 years (OR = 1.82;95%CI:1.36–2.44) and a higher BMI at 5/6 years (OR = 1.26;95%CI:1.13–1.40) were associated with an increased risk for MU profile. Growth curves of MH and MU overweight children differed ($p = 0.022$): MU children had higher BMI-SDS at 6 years (Δ :0.220, $p = 0.028$). Interaction between birth weight and weight status was significant. Among overweight children, a lower birth weight was associated with an increased risk for MU profile at 5/6 years (OR = 0.72;95%CI:0.53–0.98).

Conclusion: Accelerated growth for distinct periods from 0–5 years of age and higher BMI at 5/6 years were all associated with an increased risk for a MU profile at 5/6 years of age, with the strongest association for accelerated growth between 2–5 years. Among overweight children, low birth weight is an additional risk factor for a MU profile.

PO1.095

The frequency of metabolic syndrome among nurses who work shifts

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Background & Aim: It is often emphasized that working shifts disturbs sleep and natural biological body rhythms, tends to increase psychosocial stress, and thus paving the way for metabolic syndrome-related physiological problems. This study was planned and carried out to determine the frequency of Mets among healthcare personnel who work shifts.

Method: This study was performed on totally 110 volunteer female nurses, aged between 25 and 50 (mean age 33.0 ± 6.3 years), who work day (56) and shifts (54) at Gazi Hospital, Gazi University Health Research and Application Center, in the province of Ankara. The shift working group was composed of individuals who have worked from 4 p.m. to 8 a.m. at least 4 times a month for > 1 year while day working group was composed of those who have worked between 8 a.m. and 4 p.m. for > 1 year. Research data were obtained through a questionnaire implemented by the researcher herself, and it contained general information about the individuals, their medical information, dietary habits, physical activity assessment, and shift information of the work. Also, the participants' anthropometric measurements, biochemical measurements and blood pressure measurements were taken.

Results: According to the criteria of International Diabetes Federation (IDF), 7,3% of all the individuals who participated in the study, 9,3% of the day workers and 5,4% of the shift workers were diagnosed with MetS while in accordance with the criteria of National Cholesterol Education Program Adult Treatment Panel 3 (NCEP-ATP III), these percentages were 5,5% among all the individuals, 9,3% among the day workers and 1,8% among the shift workers ($p > 0,05$). According to both criteria, the most common components of the MetS in the research group were found to be abdominal obesity (respectively 79,1% and 37,27%) and low HDL cholesterol (23,63%).

Conclusions: To determine the relationship between shift working and Mets, further research is needed for studies with bigger sample size in which the shift working system is clearly identified in terms of quality and quantity (night shift, rotating shifts, rotating night shifts, working hours

and duration of the exposure) and all the confounding variables are taken into consideration.

PO1.096

The trend of obesity among adults aged 19–59 years in Bulgaria

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Background & Aims: The prevalence of obesity is increasing rapidly on all around the Europe. Obesity is the complex multifactorial risk factor for the non-communicable diseases. The aim is to estimate the prevalence rate of obesity among adult population in Bulgaria.

Objectives: To examine trends in obesity among adults aged 19–59 years in Bulgaria from 1998 through 2014 and the current prevalence of obesity for 2014.

Material/Methods: Data were analyzed from 3 cross-sectional studies carried out on nationally representative samples of adults in age 20–59 years old (1998, 2004 and 2014 years) as a part of national monitoring for dietary intake and nutritional status of population over 1 year in Bulgaria. Height and weight were measured in the all surveys. Obesity was defined as a BMI of 30.0 or higher.

Results: The obesity prevalence among men aged 19–29 years old were 2,4% in 1998 y; 6,1% in 2004 y and 10,2 in 2014 year and among men 30–59 years were respectively – 15,2%; 22,1% and 29,1%. The obesity prevalence among women aged 19–29 years old were 3,5% in 1998 y; 4,7% in 2004 y and 7,5 in 2014 year and among women 30–59 years were respectively – 10,7%; 16,6% and 20,4%.

Conclusion: The prevalence of obesity among adults population aged 19–59 was increased in the Bulgaria between 1998 and 2014.

PO1.097

Mother's perception of child's weight status, a cost effective alternative for BMI measurement in large scale epidemiological studies: Report and measurement data from the Growing Up in Ireland cohort study of 9 year olds

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Background: The gold standard for categorisation of weight status is clinically measured BMI but this is often not practical in large epidemiological studies.

Objectives: To determine if a child's self-image or a mother's image of a child is a viable alternative to measured height and weight in determining BMI classification. Secondary outcomes are to determine the influence of a mother's BMI on her ability to categorise the child's BMI and a child's ability to recognise his/her own BMI. Materials and

Methods: Cross-sectional analysis of the Growing Up in Ireland cohort study, a nationally representative cohort of 8568 nine-year-old children. The variables considered for this analysis are the child's gender, BMI (International Obesity Taskforce grade derived from measured height and weight), self-image, the mother's image of the child, the mother's self-image and the BMI of the mother, derived from measured height and weight. Cohen's weighted Kappa is used to evaluate the strength of the agreement

between pair-wise combinations of the BMI variables. Cumulative and adjacent categories logistic regression are used to predict how likely a person rates themselves as under, normal or overweight, based on explanatory variables.

Results: Mothers are more accurate at correctly classifying their child's BMI ($\kappa = 0.5$; CI 0.38–0.51) than the children themselves ($\kappa = 0.25$; CI 0.23–0.26). Overweight mothers are better raters of their child's BMI ($\kappa = 0.51$; CI 0.49–0.54), compared to normal ($\kappa = 0.44$; CI 0.41–0.47) or underweight mothers ($\kappa = 0.4$; CI 0.22–0.58), regardless of whether the mother's BMI is derived from measured height and weight or self-image. The mother's image of a child is not an influencing factor in the child's ability to correctly classify him/herself, but the child's image of him/herself influences the mother's ability to correctly classify the child.

Conclusions: A mother's BMI classification of her child is a viable alternative to BMI measurement in large epidemiological studies.

PO1.098

Is childhood-onset obesity associated with increased risk of co-morbidity?

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Background and Aims: Little is known about the prevalence of obesity-related co-morbidities among treatment-seeking subjects with severe obesity and the possible association between time of obesity-onset and obesity-related co-morbidities.

Objectives: The objectives were to assess; 1) the prevalence of obstructive sleep apnea (OSA), type 2 diabetes (T2D) and hypertension in treatment-seeking men and women with severe obesity, and 2) the association between time of obesity-onset and co-morbidities.

Material and Methods: The study included 4333 consecutive patients (2006–2015) from the Morbid Obesity Registry and Biobank Study at Vestfold Hospital Trust in Norway. The co-morbidities were classified according to updated guidelines. Onset of obesity was self-reported. Logistic regression models, adjusted for age and current BMI, were used to estimate the odds ratios (OR) for OSA, T2D and hypertension according to obesity-onset categories. Adult-onset obesity (age > 20) was selected as reference and compared with childhood-onset (age 0–11) and adolescent-onset (age 12–20) obesity.

Results: Mean (SD) age and BMI were 43.5 (12.0) years and 43.6 (5.9) kg/m². The majority were females (69%), and 34%, 24% and 44% of the population reported childhood-onset, adolescent-onset and adult-onset obesity, respectively. All co-morbidities were more prevalent among men than women; OSA (37% vs. 14%), T2D (34% vs. 20%) and hypertension (53% vs. 33%). Accordingly, men had significantly higher odds (OR (95% CI)) of OSA (3.50 (2.99, 4.09)), T2D (1.90 (1.63, 2.21)) and hypertension (2.07 (1.79, 2.39)), than women. Amongst those with childhood-onset obesity, women had increased while men had decreased odds of OSA (1.40 (1.04, 1.89) vs. 0.73 (0.55, 0.96)). The odds of T2D and hypertension did not differ significantly between obesity-onset categories in either gender, although there was a tendency towards increased odds (1.25 (0.99, 1.57)) of T2D among women with childhood-onset obesity.

Conclusion: Treatment-seeking men with severe obesity had 2–4-fold higher adjusted odds of OSA, hypertension and T2D, than women. Childhood-onset obesity was associated with 40% increased odds of OSA in women and 30% decreased odds of OSA in men.

Waist circumference reference curves for 14-to 18 year-old Brazilian adolescents: A Comparison study to international values

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A multitude of studies have clearly demonstrated the close relation between central obesity, expressed by waist circumference(WC) and cardiovascular events in the paediatric scenario. There is a tendency for world-wide creation of population based specific reference curves, but in Brazil it is usual to use international data as standards, with special consideration to the American ones. This has lead to non-standardized approaches towards public health measures. Therefore we developed age- and gender-specific reference curves for waist circumferences in a Brazilian population of adolescents and made a comparison study comparing those to international ones. This comparison to different populations worldwide demonstrated that Brazilian values are in the upper range of the curves obtained in different countries, strongly alerting us to take precaution towards implementation of national policies for tackling obesity, protecting the future of our paediatric population.

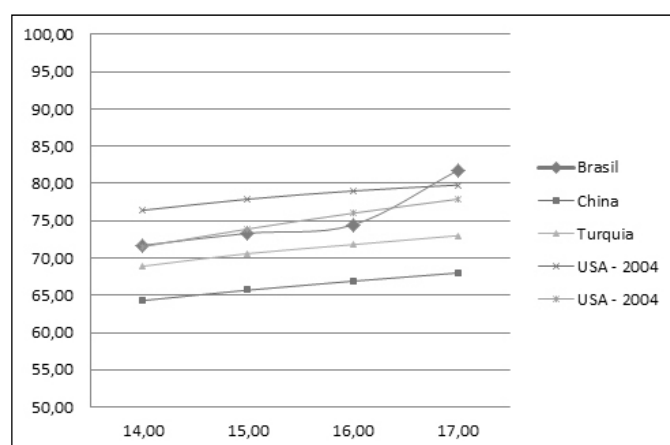


Fig. 1. Comparison Male 1
50th Percentile Comparison of male adolescents data to International Values

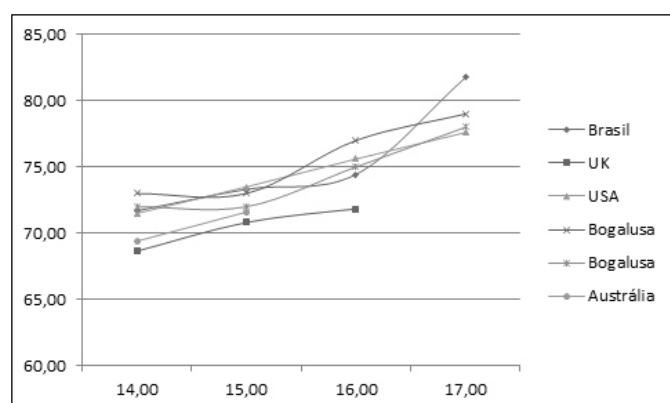


Fig. 2. Comparison Male 2
50th Percentile Comparison of male adolescents data to International Values

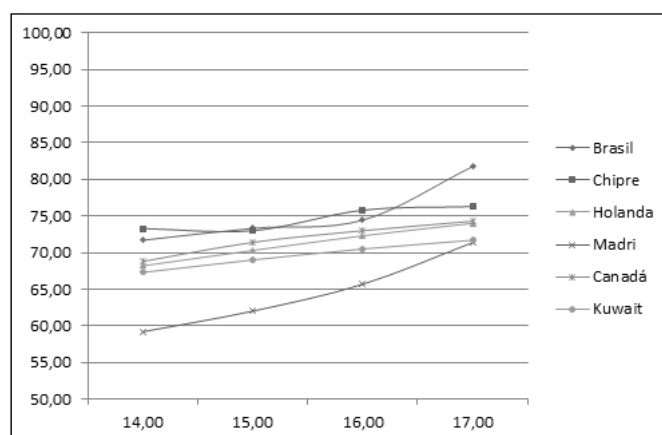


Fig. 3. Comparison Male 3
50th Percentile Comparison of male adolescents data to International Values

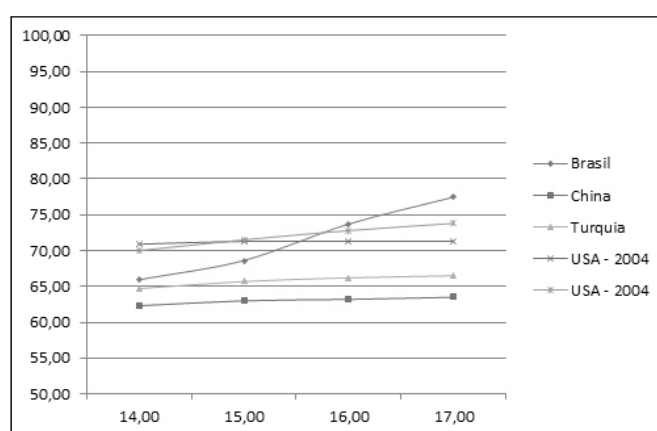


Fig. 3. Comparison Female 1
50th Percentile Comparison of female adolescents data to International Values

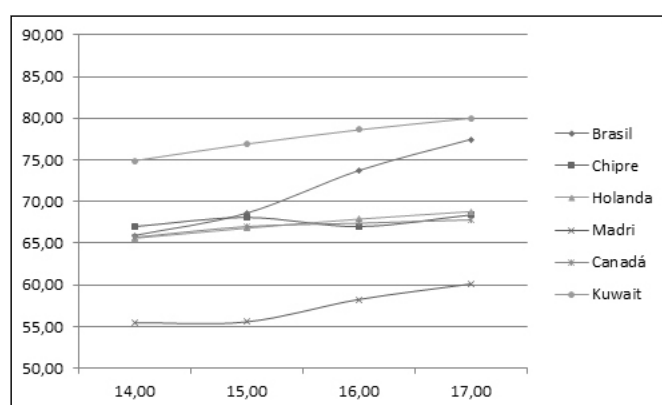


Fig. 4. Comparison Female 2
50th Percentile Comparison of female adolescents data to International Values

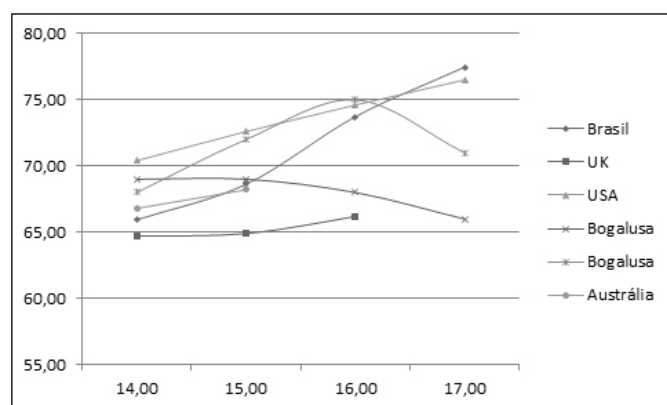


Fig. 5. Comparison Female 3
50th Percentile Comparison of female adolescents data to International Values

PO1.100

The influence of socio-demographic factors on the occurrence of the metabolic syndrome

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Introduction: The increasing prevalence of metabolic syndrome (MS) is the consequence of unfavorable changes of eating habits and diminishing physical activity in leisure time and related to professional duties which result in the accumulation of the visceral fat mass. Socio-demographic factors potentially affecting the occurrence of MS are still poorly recognized in elderly population. Therefore, the aim of the study was to analyze the influence of selected socio-demographic factors predisposing to the occurrence of MS in elderly population of the PolSenior study.

Material/Methods: The analysis included 2263 women and 2398 men, participants of the PolSenior study aged 55–59 and ≥65 years in whom data allowing the evaluation of MS diagnostic criteria (IDF 2009) were available.

Results: MS was more often diagnosed in women than in men (65.7% vs 53.7%, $p < 0.001$) – OR 1.65 (1.46–1.85). MS was most common in women aged 80–84 years (74.3%) and in men aged 65–69 years (61.0%), and less prevalent in older than 90 years (52.0 and 37.2%, respectively). It was more frequent in women, villages-dwellers than city inhabitants (67.8 vs 63.9%, $p < 0.001$), and among men, big cities inhabitants than villages-dwellers (60.3% vs 48.2%). The highest prevalence of MS was observed among participants with secondary education (63.2% women and 59.9% men). Among men without education, primary and vocational education the prevalence of MS was lowest. Smoking and frequent alcohol consumption was related to lower prevalence of MS among women.

Conclusions: The place of residence and education level, regardless of sex explain the variability of MS components prevalence in elderly polish population. Dwelling of rural areas and lower educational level seem to be factors decreasing the prevalence of MS among men.

PO1.101

Obesity at 18 year-old in Autonomous Region of Madeira, Portugal

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Background & Aim: Obesity is a worldwide Health Public problem that affect a high number of children's and has come to extend into adulthood. The aim of this study was to determine the obesity and the risk associated

to waist circumference and to waist-to-height ratio (WHTR) at 18 years-old people of the Autonomous Region of Madeira, Portugal.

Methods: A representative sample of 289 subjects, 169 women and 120 men, with 18 years-old was selected. Weight (kg) and height (cm) were measured using standards procedures and BMI (kg/m^2) was calculated. The waist circumference (cm) was evaluated at the midpoint between the iliac crest and the last rib, and waist-to-height ratio (cm/cm) was determined. The BMI, waist circumference and WHTR were categorized using the WHO classification.

Results: We found that 16,3% had overweight and 4,2% obesity, with no significant difference between sex. Considering waist circumference, the risk of metabolic complications are increased in 7,3% and substantially increased in 3,5%. We also found that 12,5% had a high WHTR.

Conclusion: In this age of transition to adulthood, we found in this population similar levels of overweight and obesity of Portugal, but considering the risk of health, it is important to signalise these people to treat and prevent metabolic and cardiovascular disease.

PO1.102

A systematic review of the international literature on the direct and indirect lifetime costs of childhood overweight and obesity completed since the year 2000

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Child overweight and obesity is arguably one of the greatest health concerns of this century. It leads to higher risk of obesity and its associated morbidity and premature mortality in adulthood, with concomitant costs. We are undertaking a systematic review of the international literature on the direct and indirect lifetime costs of childhood overweight and obesity completed since the year 2000. Reviews of work on direct lifetime costs of childhood overweight and obesity have been published for the American setting (Finkelstein 2014), and indirect costs of childhood obesity and overweight have been modelled both for the American (Finkelstein, 2010) and European (Sonntag, 2015 and 2016) settings, but the need for a systematic review of both indirect and direct lifetime costs has been highlighted. This systematic review is work in progress and is one of the part deliverables of an overall project which Aims: to estimate the lifetime costs associated With overweight and obesity in childhood on the island of Ireland. Results: will be available in time for the European Obesity Summit.

PO1.103

The relationship between albuminuria and metabolically obese but normal weight (MONW) or metabolically healthy but obese groups (MHO): Korean National Health and Nutrition Examination Survey, 2010–2011

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Background: Albuminuria is well-known as one of the risk factors for cardiovascular disease. Recently several studies have reported that metabolically obese but normal weight (MONW) group are predisposed to type 2 diabetes and premature coronary heart disease. This cross-sectional study was performed to investigate the albuminuria difference between metabolically obese but normal weight (MONW) and metabolically healthy but obese (MHO) groups in Korean men.

Methods: We used the data of 16,576 men from the 2011–2012 Korea National Health and Nutrition Examination Survey (KNHANES). MONW was defined as a body mass index (BMI) ≥ 18.5 and $< 23 \text{ kg/m}^2$ with metabolic syndrome. MHO was defined as BMI $\geq 25 \text{ kg/m}^2$ without metabolic syndrome. And albuminuria was defined urine albumin to creatinine ratio (UACR) $\geq 30 \text{ mg/g}$. Multivariate logistic regression analysis was performed to evaluate the albuminuria relationship between MONW and MHO groups.

Results: Among MetS components, high blood pressure and FPG for albuminuria are more associated than others (Correlation coefficient: SBP 0.29, FPG 0.28 for men and SBP 0.32, FPG 0.24 for female). And MONW group were higher prevalence rate for albuminuria than were the MHO group in the general population after further adjustment for confounders such as age, drinking, smoking, physical activity and waist circumference in both sexes (odds ratio [OR], 95% confidence interval [CI]: 2.76 [1.77–4.46] for male and 2.28 [1.51–3.42] for female).

Conclusions: MONW group are associated with an increased risk for albuminuria in Korean, though BMI is in normal range. Therefore, when screening for obesity, especially in Korean people, whether there is MetS or not is more important for albuminuria that is at risk for developing renal disease and cardiovascular disease, even those who are normal BMI.

PO1.104

Dietary intakes of vitamins among Bulgarian medical university students

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Introduction: A number of recent published data presented relatively high prevalence of inadequate dietary micronutrient intakes for university population in Europe. The university students consume low amounts of fruits, vegetables, and fish and choose high energy foods. This characteristic of the university eating behavior may be a relevant factor of changing the micronutrient density of student diet.

Objectives: We aimed of the study was to assess dietary intakes of vitamins in usual university diet

Methods/Design: The cross-sectional study was conducted at Pleven Medical University – Bulgaria. The representative sample included 700 health science university students (72% females), aged 19–29 years. The food consumption of the participants was collected through active interview using 3 days 24-hour dietary recall method and dietary analysis program. The prevalence of inadequate dietary intakes was calculated using the Estimated Average Requirement (EAR) cut-off points of the vitamins

Results: 1. The mean intakes of vitamins A, E, C, niacin and B6 met their Bulgarian dietary reference values (DRVs) for all groups (Fig. 1, Fig. 2) The participants had mean intake of vit. D and folate below DRVs. The mean intake of vitamin B1 in women also was under recommendations. 2. A prevalence of inadequate intake for vitamins was found as follows: $\sim 15\text{--}30\%$ for vitamin A, C, B1, B12 in men and for vitamin A, C, B2 in women; $\sim 40\text{--}44\%$ for B2 in men, respectively for B1, B12 in women. \rightarrow

The majority of the university students had inadequate intake of vitamin D (63–65%) and folate (82%), which determines serious risk of nutritional deficiency of those vitamins.

Conclusions: The results showed the need for changes in university dietary pattern, given the high prevalence of inadequate intake for folate, vitamin D and B1, B2, B12 vitamins. Reference I.M. Stojnovska, V. Birdanova, A. Penkov. University food service – good place to promote healthy nutrition model for young adults. Abstract book 32nd Balkan Medical Week 21–23 September 2012 Nis, Serbia, P100 s

Acknowledgement: Funded by a grant of the Bulgarian Ministry of Education and Research 2014

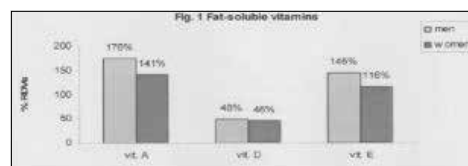


Fig. 1. The participants had mean intake of vit. D and folate below DRVs.

PO1.105

Cut-off value of percent body fat of obesity and abdominal obesity measured by Dual Energy X-ray Absorptiometry in Korean adolescents: Korean National Health and Nutrition Examination Survey (KNHANES) 2008~2011

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Background: Recently, the prevalence of obesity and metabolic syndrome is rapidly increasing among children and adolescents in South Korea. The aim of this study was to estimate the accurate cutoff value for percent body fat and trunk fat measured by dual energy X-ray absorptiometry (DEXA) in adolescents.

Methods: Among 3,895 participants, aged 10–18 years, 2648 participants were selected from the Korea National Health and Nutrition Examination Survey (KNHANES) from 2008 to 2011 and evaluated by DEXA. The cutoff value for body fat percentage was set to maximize the sum of sensitivity and specificity for detecting obesity using the Receiver Operating Characteristics (ROC) curve. The relationship between percent body fat and trunk fat with metabolic risk factors was assessed after controlling for sex and age.

Results: The cutoff value for the percent body fat used to define obesity was 32.1% in boys, 37.0% in girls among aged 10–12 years, 28.7% in boys, 35.8% in girls among aged 13–15 years, and 22.8% in boys, 36.2% in girls among aged 16–18 years. The cutoff value of percentage trunk fat for abdominal obesity was 31.5% in boys, 35.4% in girls among aged 10–12 years, 24.2% in boys, 34.8% in girls among aged 13–15 years, 23.1% in boys, 33.3% in girls among aged 16–18 years.

Conclusion: The cutoff values of percent body fat and trunk fat in Korean adolescents were lower than those suggested in previous studies.

Total Fat, %	Age (years)	10~12		13~15		16~18	
		Overweight	Obesity	Overweight	Obesity	Overweight	Obesity
Male	Cut-off value (%)	32.1	32.1	21.8	28.7	21.5	22.8
	Sensitivity (%)	97.0	97.3	92.0	87.5	84.6	81.1
	Specificity (%)	77.5	71.0	68.3	87.7	84.8	74.3
	AUC	0.93	0.90	0.88	0.93	0.90	0.89
Female	Cut-off value (%)	32.6	37.0	35.3	35.8	36.2	36.2
	Sensitivity (%)	96.5	89.5	84.9	93.8	76.6	91.9
	Specificity (%)	70.4	87.5	76.3	73.8	80.4	76.1
	AUC	0.89	0.93	0.88	0.89	0.86	0.89

Table 1. to PO1.105 The accuracy of the diagnosis for obesity using total fat% by DEXA compared with the obesity diagnosed by BMI.

Four years post maternal Roux-en-Y Gastric Bypass surgery: Influences on spouses and children

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Background and Aims: Few studies have investigated possible halo effects on the family from a women's Roux-en-Y Gastric Bypass (RYGB) surgery. The aim was to investigate 4 years post maternal RYGB changes in weight and psychosocial functioning among woman, spouses and children.

Objectives: Investigate possible differences in women and spouses psychosocial functioning, eating behavior, BMI and children's overweight and obesity, eating behavior, body esteem and self-concept before and 4 years after maternal RYGB?

Material/Methods: Sixty-nine women eligible for RYGB were recruited. Weight, height, waist circumference and fat mass were measured 3 months pre-surgery and 1 year and 4 years post-surgery on the women and their spouses and children. The families also completed several questionnaires at the same time points as for the measurements [1, 2].

Results: So far we finished the third measurement within 28 women including 13 partners and 36 children. Mean number of years between 1st and 3rd measurement was 3.6 years. Women decreased mean BMI with -12.3 kg/m² (range -4.0; -21.2) 4 years after surgery. Among children, there was a unadjusted 3.5 times higher odds of being obese 4 years after their mother underwent RYGB compared to before surgery. Children had an unadjusted lower self-esteem and self-concept comparing before and 4 years after maternal RYGB.

Conclusion: RYGB surgery among women might have an influence on their children's risk of developing obesity and a lower self-esteem and self-concept.

Acknowledgement: We would like to thank involved hospitals for help with recruitment of study participants. There are no reported conflicts of interest.

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Diabetes and aging are associated with lower methylation levels of the irisin (FNDC5) gene, whereas higher adherence to the Mediterranean diet and physical activity increased methylation of these CpG sites in the PREDIMED-Valencia Study

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Background and Aims: Irisin, also called the exercise hormone, is a novel myokine which plays an important role in metabolic disorders, such as obesity, insulin resistance, and type 2 diabetes. However the mechanisms of action still remain largely unexplained. In a previous study we have found some significant associations between polymorphisms in the irisin gene (fibronectin type III domain-containing protein 5; FNDC5) and metabolic phenotypes. Moreover, we have detected that adherence to the Mediterranean diet (MedDiet) and physical activity (PA) modulated these

associations. DNA methylation is an important epigenetic determinant of gene expression and can explain dietary and PA modulations. Our Aims were: 1) To analyze if the methylation levels in selected CpG Island in the FNDC5 gene differed by obesity-related phenotypes and age 2) whether higher adherence to the MedDiet and PA affected methylation levels of this gene.

Methods: We randomly selected 181 high cardiovascular risk participants in the PREDIMED-Valencia Study (aged 67+/-7 years). DNA was obtained from leucocytes. Quantitative DNA methylation analysis of the FNDC5 gene at baseline was undertaken by matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry. We evaluated methylation levels at baseline in 6 CpG sites in amplicon A (Chr1:32865223–32865601). The CpG sites were located as follows: CpG1:32865300; CpG2:32865322; CpG3:32865324; CpG4:32865484; CpG5:32865527 and CpG6:32865551. Anthropometric, clinical and life-style variables were obtained.

Results: and Conclusions: Mean methylation levels (expressed as % of methylated C) of the most relevant sites decreased with age: From 0.900 ± 0.046 in subjects < 59y to 0.883 ± 0.039 in subjects aged 75+y (CpG4; P = 0.001). Also lower levels were detected in diabetic subjects (0.884 ± 0.053 vs 0.897 ± 0.040 in non-diabetics; CpG4, P = 0.05). No differences were found in obese subjects. Methylation levels were significantly lower in sedentary (0.903 ± 0.038) vs non-sedentary (0.920 ± 0.041; CpG5; P = 0.02), and increased with higher adherence (>= 9 points) to the MedDiet (0.902 ± 0.042 vs 0.878 ± 0.050 in < 9 points; CpG4, P = 0.001). This association remained significant in the multivariable analysis even after additional adjustment for leukocyte cell count.

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Evaluation of the SmartIntake smartphone app and food records for measuring adolescents' energy intake in three conditions against three gold standards

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Purpose. The SmartIntake smartphone app accurately measures adults' energy intake (EI). When using the app, participants capture images of their food selection and plate waste. The app sends these images to a server for analysis where energy (and nutrient) intake is estimated using validated visual comparison procedures. This study tested the validity of SmartIntake, as well as food records, when used by adolescents against multiple gold-standard measures of EI.

Methods. Forty-five participants (age 12–18 years; 69% female; 69% Caucasian) used the SmartIntake app during: 1) a laboratory-based test meal with directly measured EI as the gold-standard, 2) a cafeteria where energy intake was also measured with validated visual comparison methods as the gold-standard, and 3) one week while free-living with simultaneous measures of EI by doubly labeled water (DLW). EI was measured under the same three conditions with pen-and-paper food records. Satisfaction ratings were collected for both methods. Linear mixed models determined if EI from SmartIntake and food records differed from the gold-standards. Bland-and-Altman analyses determined if error differed over levels of EI. Alpha = .05.

Results. EI from SmartIntake did not differ significantly from the gold standards during the test meal (Mean+SE; 1.1+26.6 kcal) and cafeteria meal (0.5+44.3 kcal), but did differ significantly from DLW in free-living conditions (-723+85.7 kcal/day). Bland-and-Altman for SmartIntake were non-significant. EI from food records differed significantly from the gold standards during the test meal (143+26.6 kcal) and in free-living conditions (-632+85.4 kcal/day), but not during the cafeteria meal (-0.2+44.3

kcal). Bland-and-Altman for food records indicated significant differences in error over levels of EI during the lab and cafeteria meals, but not during free-living conditions. Participants preferred SmartIntake and satisfaction and ease of use ratings favored SmartIntake over food records. **Conclusions.** The SmartIntake app was accurate in more conditions than food records and was preferred by the adolescents. Nonetheless, it had sizeable error in free-living conditions. The method requires modifications to improve accuracy in such settings, such as improving its Ecological Momentary Assessment methods. Even when accurate at a group mean level, error from food records varied widely depending on how much energy was ingested.

PO1.109

Micronutrient supplementation after biliopancreatic diversion with duodenal switch in the longterm

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Introduction: Malabsorptive bariatric surgery requires life-long micronutrient supplementation. Based on the recommendations, we assessed the number of adjustments of micronutrient supplementation and the prevalence of vitamin and mineral deficiencies at a minimum follow-up of 5 years after biliopancreatic diversion with duodenal switch (BPD-DS). **Methods:** Between October 2010 and December 2013, a total of 51 patients at a minimum follow-up of 5 years after BPD-DS were invited for a clinical check-up with a nutritional blood screening test for vitamins and minerals.

Results: Forty-three of fifty-one patients (84.3%) completed the blood sampling with a median follow-up of 71.2 (range 60–102) months after BPD-DS. At that time, all patients were supplemented with at least one multivitamin. However, 35 patients (81.4%) showed either a vitamin or a mineral deficiency or a combination of it. Nineteen patients (44.1%) were anemic, and 17 patients (39.5%) had an iron deficiency. High deficiency rates for fat-soluble vitamins were also present in 23.2% for vitamin A, in 76.7% for vitamin D, in 7.0% for vitamin E, and in 11.6% for vitamin K.

Conclusions: The results of our study show that the prevalence of vitamin and mineral deficiency after BPD-DS is 81.4% at a minimum follow-up of 5 years. The initial prescription of micronutrient supplementation and further adjustments during the follow-up were insufficient to avoid longterm micronutrient deficiencies. Lifelong monitoring of micronutrients at a specialized bariatric centre, and possibly a better micronutrient supplementation, is crucial avoid a deficient micronutrient status at every stage after malabsorptive bariatric surgery.

PO1.110

Relationship between socio-economic position and obesity: Identification of lifestyle and eating behaviour mediators

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Background/Aims: Socio-economic position (SEP) is a strong determinant of lifestyle and eating behaviours and of obesity risk.

Objectives: This research aimed to understand which eating and lifestyle behaviours acted as mediators of the association between SEP and obesity.

Methods: We conducted a case-control study enrolling 318 obese patients consulting for obesity (76% women, age = 41 yrs, BMI = 42 kg/m²) and 371 non-obese controls (77% women, age = 39 yrs, BMI = 22 kg/m²) recruited in a preventive health centre. Three lifestyle behaviours were evaluated (smoking habits, physical activity and inactivity). Nine eating behaviour traits were assessed both by the TFEQ-R21 and a questionnaire about eating circumstances. The SEP was established with a score

constructed using occupation, education, income and divided in three groups. Mediation analysis was conducted using the test of joint significance and difference of coefficients.

Results: We confirmed that the risk of obesity was higher for individuals in the low SEP group (OR = 1.97, $p = 0.0021$) and lower for individuals in the high SEP group (OR = 0.57, $p = 0.0016$) compared with individuals in the intermediate group. Obese subjects had lower physical activity ($p < 0.0001$) and spent more time watching TV ($p < 0.0001$) than non-obese subjects. Serving at least twice were associated with a higher risk of obesity (OR = 3.43, $p < 0.0001$). In addition, obese subjects reported more often to have a fullness of stomach and a plate or dish empty for stopping eating (OR = 1.86, $p = 0.009$ and OR = 1.54, $p = 0.01$, respectively). Cognitive restraint ($p < 0.0001$) and emotional eating ($p < 0.0001$) scores were higher in obese than in non obese but independently of SEP. Time spent watching TV ($p < 0.0001$), physical activity ($p < 0.0001$), eating in a large plate size ($p = 0.01$), eating during the night ($p = 0.04$) and uncontrolled eating ($p = 0.03$) were significant mediators in the relationship between SEP and obesity.

Conclusion: Our study contributes to better identify the obesogenic behaviours among socially disadvantaged subjects. Mediation analysis showed the importance of time watching TV, physical activity, plate size, uncontrolled eating and eating during the night in the relationship between SEP and obesity risk. In contrary, some other eating behaviours were strong determinants of the risk of obesity, independently of the SEP.

PO1.111

Novel approach to estimate associations between 24h dietary recall data of children and their parents

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Background & Aims: Unhealthy diet is known to be one of the main risk factors for obesity and related comorbidities. Accurate measurement of intake is required and can be obtained from 24-h dietary recall (24HDR) data. Estimated usual energy intake (kcal/day) can be used to correct for variance inflation in short-term dietary data. As dietary exposures are various, approaches are needed to describe intake based on dietary patterns. Finally, this simplified exposure may be helpful to estimate associations between children's diet and parental diet.

Objectives: To derive a novel approach to estimate associations between 24HDR of children and their parents accounts for issues mentioned above.

Material & Methods: Different statistical methods which are commonly used in nutritional data analysis are applied to account for: (1) The measurement error correction model, the so-called National Cancer Institute Method, accounts for the day-to-day variation in 24HDR¹. (2) The k-means cluster method can handle multivariate dietary exposures by deriving dietary pattern (DP)². (3) Mixed effect logistic regression models that estimate associations between children's and parent' DP using a random effect to account for family effects. We suggest combining these methods in a stepwise approach, which is applied to 24HDR data from 1,976 children and 1,885 parents of the I.Family study to check its feasibility.

Results: The novel method to estimate associations between 24HDR of children and parents identified three different DPs (Figure 1). It could be shown that children's and parents' DP are associated.

Conclusion: The proposed approach proved to be feasible and provided meaningful results although there are issues of error propagation to be further investigated.

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Naturalistic Snack Consumption, Body Composition and Cardiovascular Health in Children

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Background/Aims: Conscious lifestyle strategies – eating less and moving more – are proving a small part of the solution for cardiovascular disease (CVD) and obesity. Although poor diet is a modifiable lifestyle choice that contributes to obesity and other CVD risk factors, previous research has been challenged by examining naturalistic food consumption at the population level.

Objectives: The nationally representative Child Health CheckPoint captured children's naturalistic food consumption and various physical assessments. With the objective to better inform childhood health interventions and policy, we examined the associations between objectively measured snack choices, body composition and cardiovascular health in a population sample of 11–12 year old children.

Methods: Design: Population-based cross-sectional study (n = 720). Procedures: Body composition and cardiovascular health were measured within a pop-up Assessment Centre which travelled Australia during 2015. Children attended an individual 15-minute Food Stop with a pre-weighed snack box. Exposures: Total energy (kJ), saturated fat (g), sugar (g) and sodium (mg) consumed. Outcomes: BMI z-score, waist circumference, percentage body-fat; macrovascular: carotid-intima media thickness (cIMT; mm); endovascular: systolic, diastolic and central mean arterial pressure (SBP, DBP, MAP; mmHg), carotid-femoral pulse-wave velocity (PWV; m/s), central augmentation index (AIx; %); microvascular: retinal-arteriole-venule ratio (AVR). Analyses: Linear regression models adjusted for potential confounders.

Results: For every 10g increase in saturated fat intake, DBP and MAP increased by 1.1mmHg and 1.4 units. For 10g increases in sugar intake, BMI z-score increased by 0.10 units and AIx increased by 0.2%. For every 1000mg increase in sodium intake, DBP increased by 1.1mmHg and AVR decreased by 0.04 (CI: -0.10, 0.00). Finally, for every unit increase in energy and saturated fat intake, cIMT decreased by 0.02mm and 0.03mm.

Conclusion: Snack choice was associated with poorer BMI, endo- and micro-vascular health, but slightly better macrovascular health. Naturalistic food intake of fat and sugar are associated with poor body composition and cardiovascular health in children at the population level and strengthen the growing need for policy intervention.

Association between parental dietary patterns and number of shared family meals on children's dietary patterns across Europe: Results from the I.Family Study

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Objectives: To investigate associations between parental dietary patterns (DP) and number of shared meals with the children's DP.

Methods: In 2013/ 2014 the I.Family study examined 6,182 families from eight European countries. Dietary intakes were assessed using repeated 24-h dietary recalls (24HDR). Forty-seven food groups emerged from the 24HDR and were combined into nine broad food categories. Estimation of usual daily intake (g/day) for usual energy intake (kcal/day) was corrected for variance inflation in short-term dietary data based National Cancer Institute Method¹ and healthy-unhealthy pairs for each food category were calculated. DP of 1,976 children and 1,885 parents providing plausible reported energy intakes and complete co-variables were derived by cluster analysis. Clusters similar for children and parents were identified based on comparable clusters considering healthy and unhealthy food choices. Associations between maternal or paternal DP and number of shared meals with children's DP were estimated using mixed effect logistic regression, adjusted for sex, age and BMI-z-score of children, highest parental education level, country and BMI of respective parent.

Results: Three DP comparable in children and parents were obtained: Sweet & Fat (N = 697 for children, N = 728 for parents), Refined Cereals (N = 563 for children, N = 410 for parents) and Animal Products (N = 716 for children, N = 747 for parents). The Refined Cereals DP was mainly represented by overweight/ obese children and by participants from low educated families. Association between parental DP and the children's DP increased with increasing number of shared meals and was in particular strongest for maternal Refined Cereals DP and paternal Animal Products DP.

Conclusion: Our findings reflect the influencing nature of shared family meals and the need for healthy eating interventions targeting children, adolescents and parents to focus on role modelling and the food environment.

Results suggest that intervention activities should target parents from low educational background as gatekeepers for the family food environment and as providers of healthy food alternatives at home at any time.

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Fig. 1. Dietary pattern of children and parents in the I.Family Study

High incidence of Vitamin D insufficiency and deficiency in morbidly obese Irish patients undergoing bariatric surgery

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Aim: Assess preoperative Vitamin D status of a consecutive series of patients undergoing bariatric surgery at a single institution.

Background: Vitamin D is important for Ca homeostasis and skeletal integrity. Vitamin D is measured through Serum 25-hydroxyvitamin D (25(OH)D) reflecting both dietary supply and dermal production from exposure to UVB sunlight. The Irish population is in particular risk due to low levels of UVB-induced dermal synthesis (Cashman, 2013). Furthermore, a group which are high risk are post-op bariatric surgery patients due to reduced absorption in the intestine (Aarts, 2011). For this reason, it is important to examine Vitamin D status in a morbidly obese population prior to surgery.

Methods: Serum 25(OH) D was measured through immunoassay was assessed on all patients undergoing bariatric surgery between January 2014 and December 2015. Demographic data including age, sex and BMI were also collected. The relationship between Vitamin D status, age, sex, BMI and season were assessed using a linear regression. Statistical significance was defined as $P < 0.05$.

Results: A total of 92 patients were included in the analyses. 26 (28%) were male. The average age (SD) was 48 (10). The mean BMI (SD) was 49 (8) kg/m². The mean preoperative Vitamin D was 42 (16) nmol/L. Only 24 (26%) patients had normal Vitamin D levels (> 50 nmol/L), 48 (52%) had insufficient levels (< 50 nmol/L) and 20 (21%) were deemed deficient (< 30 nmol/L). Contrary to previous studies there was no association between male sex, age, BMI with vitamin D levels – see table 1. Furthermore, there was no significant seasonal variation. In comparison to the national average (SD) estimates from an Irish study of 60 (24) nmol/l, the mean (SD) vitamin D level amongst our patients of 42 (16) was clinically and statistically significantly lower ($p < 0.000$).

Conclusions: Rates of vitamin D deficiency and insufficiency in patients undergoing bariatric surgery in Ireland are very high. This research highlights the importance of routinely analyzing vitamin D status for all patients undergoing bariatric surgery so that appropriate supplementation can be instituted at an early stage.

PO1.115

Is the intake of simple carbohydrates more reduced after laparoscopic Roux-en-Y gastric bypass compared to laparoscopic gastric sleeve resection?

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Background: It is assumed that patients, after Laparoscopic Roux-en-Y Gastric Bypass (LRYGB), due to aspects such as the dumping syndrome, eating fewer simple carbohydrates compared to after Laparoscopic Sleeve Gastrectomy (LSG). This article describes the differences in intake of simple carbohydrates before and after LRYGB and LSG and the excess weight loss results (%EWL). Another subsequent aspect of this study is the usefulness of the Dutch Sweet Eating Questionnaire (DSEQ), to indicate the choice for LRYGB or LSG. Method This single center study is a prospective randomized controlled trial comparing LRYGB versus LSG and includes 150 patients. The intake of simple carbohydrates is preoperatively, 8 weeks and 1 year postoperatively calculated using the DSEQ, a validated questionnaire which calculates/estimates intake of simple carbohydrates. During those same moments patients were also weighed.

Results: Regarding the whole population, there is a significant reduction of intake of simple carbohydrates 1 year after LRYGB ($p = 0.007$). Regarding the preoperative “sweet-eaters”, there is a significant difference in intake one year postoperative (61.5 grams/day after LSG vs. 12.9 grams/day after LRYGB, $p = 0.039$). One year after LSG there is an increase of intake, compared to 8 weeks postoperatively. After LRYGB there is a persistent decline during one year postoperatively. There is no significant weight loss (%EWL) between these groups.

Conclusions: LRYGB leads to a significant reduction of simple carbohydrate intake. Patients who were calculated to be preoperative ‘sweet eaters’ using the DSEQ, consume fewer simple carbohydrates after LRYGB, compared to LSG. The DSEQ might be useful to determine the choice for which type of surgery is best for the patient with regards to consumption of carbohydrates. The clinical relevance regarding weight loss is not proven yet.

PO1.116

Association between Nutrition Label Use and obesity in Korean Adults: The Fifth Korea National Health and Nutrition Examination Survey 2010–2011 (KNHANES V)

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Objectives: This study examined whether nutrition label use was associated with obesity in Korean adults involved in the 2010–2011 Korea National Health and Nutrition Examination Survey. Materials and methods A total of 11,950 subjects (5,395 men and 7,180 women) were included. The groups are divided to non-recognition of nutrition label (NR), recognition but non-use of nutrition label (RNU), and recognition and use of nutrition label (RU) by sex. The nutrition label use was assessed using

Table 1. Effect of Sex, Age, BMI and season on pre-op Vitamin D

Vitamin D	Coefficient	CI	p-value
Sex (male)	-6.7	-14 – 0.6	0.07
Age	0.2	-0.1 – 0.5	0.2
BMI	-0.4	-0.5 – 0.8	0.08
Season			
Summer	Baseline group	Baseline group	Baseline group
Spring	-0.6	-9.2–7.9	0.8
Autumn	3.7	-6–13	0.4
Winter	-1.9	-12–8	0.7

a questionnaire included in the survey. Multivariable logistic regression analysis was used to obtain odds ratio (OR) and 95% confidence intervals (CI) for the prevalence of obesity according to the label use.

Results: In both men and women, RU group were younger and had higher income than RNU and NRU groups in obese or non-obese subjects. As the body mass index (BMI) increases, the proportion of RU increased, however, proportion of NRU decreased in men. In women, there was not consistent relationship between BMI and the prevalence of obesity among three labeling groups. RU group had the lowest prevalence of abdominal obesity in both men and women. After adjusting for all covariates, based on RU group as reference, ORs (95% CI) for the prevalence of obesity and abdominal obesity were 1.322 (1.072–1.631) and 1.355 (1.090–1.684) respectively, in women. There was no relationship between obesity or abdominal obesity and label use in men.

Conclusion: Nutrition label use was associated with the prevalence of obesity and abdominal obesity in women not in men. Further prospective studies are needed to reveal the causal relationship between label use and the prevalence of obesity. Appropriate efforts to provide an education for the label use are needed to control weight and prevent obesity.

PO1.117

Sugar sweetened beverages are the dominant source of sugar intake: Results from 5–6 year old children from the WAVES study, UK

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Background & Aims: Recent guidance advises intake of non-milk extrinsic sugars (NMES) should not exceed 5% of energy intake.¹ There is increasing concern over intake of NMES from sugar-sweetened beverages (SSBs) and their link to weight gain in children.² The WAVES study is a cluster randomised obesity prevention intervention trial in primary schools across the West Midlands.³ Baseline information, including dietary intake, were collected from children in 2011–12. The aim of this study is to identify NMES intake on a sample of children aged 5–6 years. **Objective:** To identify NMES intake in a sample of 5–6 year old children from the West Midlands using two nutrient databanks.

Material/Methods: Dietary intake was assessed using the Child and Diet Evaluation Tool (CADET) which derives macronutrient data from McCance and Widdowson's nutrient database (2015), providing information on total sugar intake. To identify NMES intake, a variable was calculated using the UK National Diet and Nutrition survey (NDNS) databank. Food items used in CADET were matched from the McCance and Widdowson database to the NDNS databank, identifying the ratio of NMES and intrinsic sugar in each food item. This ratio was applied to the 'total sugar' variable generated from the CADET data.

Results: Mean intake of NMES ($n = 1085$) was 74.6g (SD 28.5g), 17.4% of energy intake. Of the total NMES consumed, 40% was from SSBs (25% from 'fizzy drinks, squash and fruit drinks' and 15% from 'fruit juice and smoothies'), 8% from 'cakes, buns and sponge puddings', and 7% from 'yoghurt and fromage frais'.

Conclusion: Children's NMES intake exceeds UK guidelines. These findings support public health concern over high intakes of SSBs given their possible contribution to excess weight gain. Identifying differences in subgroups from the main WAVES study data, when available, will be important for targeted interventions.

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PO1.118

Cross-sectional and longitudinal associations between energy intake and BMI z-score in European children

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Background: Evidence for the effect of dietary energy on BMI z-scores in young children is limited.

Objective: To investigate cross-sectional and longitudinal effects of daily energy intake (EI) on BMI z-scores of European boys and girls considering growth-related height dependencies of EI using residual EI.

Methods: Subjects were children aged 2– < 10 y old ($N = 2,753$, 48.2% girls) participating in the IDEFICS (Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infantS) base-

line and follow up examination. Usual EI (kcal/day) was calculated based on the National Cancer Institute-method excluding subjects with implausible reported EI. Effect of age, height and sex-adjusted residuals of EI on BMI z-score was investigated stratified by baseline age –group (2– < 4 y, 4– < 6 y, 6– < 8 y and 8– < 10 y) cross-sectionally using linear regression models adjusted for relevant confounders (crude model: age, sex, country; fully adjusted model: plus parental ISCED level, parental BMI, screen time; subgroup analysis: plus objectively measured physical activity). Longitudinal associations were estimated between changes in (δ) residual EI per year and δ BMI z-score per year with adjustments analogously to the cross-sectional models but with additional adjustment for residual EI at baseline.

Results: Cross-sectionally, positive associations were observed between residual EI and BMI z-score for the full study sample, for boys and in older (≥ 6 years) but not in younger children in the crude and fully adjusted model. Longitudinally, small positive associations were observed between δ residual EI per y on δ BMI z-score per y for the full study sample and in 4– < 6 y olds in the crude and fully adjusted model.

Conclusion: In conclusion, EI above the average intakes for a certain sex, age and height are associated with BMI z-scores in European children. Residual EI may be considered as a useful exposure measure in children as it accounts for growth-related changes in usual EI during childhood.

PO1.119

Changes in dietary energy density and food selection after gastric bypass (RYGB) in Swedish adolescents (Adolescent Morbid Obesity Surgery, AMOS)

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Introduction: Gastric by-pass for morbid obesity favorably changes dietary patterns in adults. The aim of the study was to assess food intake in adolescents undergoing RYGB.

Methods: 81 patients (65% girls, age 13–18y), body mass index $45.5 \pm 6.1 \text{ kg/m}^2$, were assessed preoperatively, and at 1 and 2 years after RYGB. Food intake was assessed by diet history interviews. Changes were assessed by t-test or Wilcoxon's signed rank test. Results: Body weight (BW) decreased by 33% 2 years after RYGB (Table 1). Total energy intake (EI) decreased at 1 and 2 years postoperatively (-33;-20%). However, EI in relation to BW increased at 2 years after RYGB (+20%). Food weight decreased at 1 and 2 years (-22;-11%) and dietary energy density decreased at 1 year (-10%) but this decrease was not significant at 2 years. Macronutrient distribution was stable during 2 years while energy from fiber and alcohol increased significantly. The largest decreases compared to baseline among 13 food groups at 1 and 2 years were milk (-63;-69%), candy (-49;-41%), sandwiches (-31;-23%) and cooked meals (-31;-20%, $p < 0.05$ for all). Energy from cereals decreased at 1 and 2 years (-53;-65%, $p < 0.05$ for both). At 1 year consumption of desserts (-65%) and salty snacks (-52%) decreased ($p < 0.05$ for all) but this was not significant year 2. One year after RYGB adolescents ate more fruit and berries (+36%). Alcoholic drinks (+100;+139%) and coffee/tea (+98;+83%) were the only food groups that increased 1 and 2 years after RYGB ($p < 0.05$ for all).

Conclusions: After RYGB adolescents experience similar changes in dietary intake as adults reducing total energy intake but increasing energy intake related to body weight, probably reflecting alterations in body composition. Macronutrient distribution was stable although food selection changed to the better. These changes were most pronounced at one year, including a reduced intake of desserts and salty snacks and an increased

intake of fruit and berries, which might reflect reduced energy density. Continued behavioral support is recommended to maintain good eating habits.

PO1.120

Post-prandial glycaemic control is impaired after 24 h severe energy restriction

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Background: Obesity is a risk factor for several chronic diseases, including type-2 diabetes (1), emphasising the need for successful weight management strategies. Intermittent severe energy restriction can achieve ~6% weight loss in 6 months and improve fasting insulin sensitivity (2). Whilst a 48 h fast (i.e. complete energy restriction) impairs postprandial insulin sensitivity (3), the postprandial response to short term severe energy restriction is unknown.

Objective: To investigate the effect of 24 h severe energy restriction on indices of insulin sensitivity.

Methods: In randomised order, eleven healthy, lean males consumed a 24 h diet containing 100% (10742 (728) kJ; EB) or 25% (2697 (183) kJ; ER) of estimated energy requirements. The following morning, plasma glucose, insulin, non-esterified fatty acid (NEFA), glucagon-like peptide-1 (GLP-1) and glucose-dependant insulinotropic peptide (GIP) concentrations were determined for 2 h after consumption of 75g glucose. The homeostatic model of insulin resistance assessment (HOMA-IR) was used to assess fasting insulin resistance and area under the curve (AUC) used to assess postprandial responses.

Results: HOMA-IR decreased 25% during ER ($P < 0.05$) but was unchanged during EB ($P = 0.575$). AUC for plasma glucose ($P < 0.01$) and NEFA ($P < 0.01$) were greater during ER than EB, but AUC for plasma insulin ($P = 0.406$), GLP-1 ($P = 0.419$) and GIP ($P = 0.376$) were not different between trials.

Conclusion: 24 h severe energy restriction improved fasting insulin sensitivity, but impaired postprandial glycaemic control. This has implications for individuals using intermittent severe energy restriction diets for weight management, and therefore the chronic effects of intermittent severe energy restriction on postprandial insulin sensitivity warrants further investigation.

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PO1.121

In morbid obese subjects, a high intake of non-caloric artificial sweeteners is associated with an unhealthy lifestyle

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Background & Aims: Subjects with morbid obesity (MO) use non-caloric artificial sweeteners (NAS) to reduce the caloric intake. NAS have been associated with increased appetite and weight gain, glucose intolerance, fatigue, depression and gastrointestinal disorders. This study describes the use of NAS and associations with lifestyle in subjects with MO.

Objectives: The objective was to achieve new knowledge that could improve counselling of subjects with MO.

Material/Methods: Subjects with BMI > 40 or > 35 kg/m² with complicating disorders referred to a specialised hospital unit were included in a cross-sectional study. A wide range of variables was recorded, including demographics, symptoms and signs. Dietary habits were measured with a validated food frequency questionnaire. NAS were calculated in carbonated beverages, non-carbonated beverages (juice/squash/iced tea), and in tea/coffee. One NAS-unit was defined as 100 ml beverage or two sweetener units.

Results: Out of 350 consecutive subjects, 159 accepted participation and 100 (female/male: 83/17, mean age 44 years (SD = 8.5) and BMI 42 kg/m² (SD = 3.5)) had filled in food frequency questionnaires. Median intake of total NAS was 3.3 (range 0–43), and the intake of NAS in carbonated beverages, non-carbonated beverages and tea/coffee were 0.4 (0–40), 0.1 (0–32), and 0.0 (0–27) respectively. A high intake of NAS was associated with reduced physical activity ($\rho = -0.237$; $p = 0.02$), fatigue ($\rho = 0.307$; $p = 0.002$) and diarrhoea ($\rho = 0.259$; $p = 0.02$), but not with BMI. Only NAS in carbonated beverages was associated with fatigue, and only NAS in tea and coffee with diarrhoea. A high intake of NAS in carbonated beverages was associated with high intake of total energy ($\rho = 0.257$; $p = 0.01$), fat ($\rho = 0.303$; $p = 0.002$), carbohydrates ($\rho = 0.227$; $p = 0.02$) and sugar ($\rho = 0.291$; $p = 0.003$).

Conclusion. Use of NAS, particularly in carbonated beverages, was associated with reduced physical activity, fatigue, and increased intake of energy, fat and sugar. This unhealthy lifestyle should be called attention to when counselling subjects with MO. No favourable effects of NAS were observed.

Acknowledgement: Thanks to Innlandet Hospital Trust, Norway for funding the study.

Table 1. Anthropometry, dietary intake, dietary energy density and macronutrients in obese adolescents before and after Roux-en-Y gastric bypass surgery (mean±SD)

* $p < 0.05$ refers to difference from baseline ** $p < 0.001$ refers to difference from baseline E%, percentage of energy intake

	Baseline (n = 79)	Post surgery 1 year (n = 75)	Post surgery 2 years (n = 71)
Age (years)	16	17	18
Body weight (kg)	133 (±22)	91 (±17)**	89 (±18)**
BMI (kg/m ²)	45.5 (±6.1)	30.8 (±4.7)**	30.1 (±4.8)**
Energy intake (kcal)	2479 (±1039)	1675 (±546)**	1976 (±657)**
Energy intake (kcal/kg)	19 (±8)	19 (±8)	23 (±9)*
Food weight (g)	2259 (±946)	1781 (±743)*	2041 (±1015)*
Dietary energy density (kcal/g)	1.13 (±0.29)	1.02 (±0.30)*	1.06 (±0.33)
Protein (E%)	17.7 (±3.2)	17.2 (±3.5)	17.0 (±4.0)
Fat (E%)	29.0 (±5.2)	28.0 (±6.2)	28.6 (±5.9)
Carbohydrates (E%)	49.8 (±5.1)	49.4 (±6.5)	49.5 (±7.9)
Fiber (E%)	1.7 (±0.4)	1.9 (±0.6)*	1.9 (±0.6)*
Alcohol (E%)	1.8 (±4.2)	3.4 (±6.4)*	3.0 (±5.9)*

Fat, sugar and water intakes among families from the IDEFICS intervention and control groups: First observations from I.Family

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Introduction: A health promoting family environment could be of great value for preventing obesity in children. The objective of this paper was to investigate differences in diets of families in intervention versus control communities five years after the Identification and Prevention of Dietary- and Lifestyle-Induced Health Effects in Children and Infants (IDEFICS) intervention ended.

Methods: Altogether, 4,691 families from the I.Family study (follows the existing IDEFICS cohort) with at least one participating parent and one child were included in this analysis. A 59-item food frequency questionnaire was used to calculate diet quality indicators defined as propensities to consume fat, sugar, water and fruit and vegetables. Multilevel linear models with random intercepts for study center were used to determine whether mean diet indicators, calculated at the family level, differed as a function of previous exposure to the intervention.

Results: Families in the intervention communities reported a significantly lower sugar propensity (19.8% vs. 20.7% of total food items, $p < 0.01$) and a higher water propensity (47.3% vs. 46.0% of total beverages, $p < 0.05$) compared with families in the control communities, while fat and fruit and vegetables propensities were similar. No significant diet differences between intervention and control children were present at the IDEFICS baseline.

Conclusion: This result indicates better diet quality in intervention families, which was not present in children when their diets were assessed before the intervention, and gives some cause for optimism regarding the sustainability of some aspects of the diet intervention in the IDEFICS study.

Loss of control eating and picking or nibbling after bariatric surgery: Trajectories of weight loss in a two years longitudinal study

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Background and Aims: Despite bariatric surgery is considered the treatment of choice for severe obesity, results can vary as some patients report poor weight loss and/or weight regain in the long term. Although eating behaviors have been associated with poor outcomes, little is known about their stability over time and their impact on weight loss trajectories.

Objectives: This longitudinal study assessed loss of control eating (LOC) and picking or nibbling (P&N) before and after bariatric surgery, and investigated their stability over time and its association with weight trajectories after surgery.

Material/Methods: Out of the 130 consecutive patients assessed pre-operatively, 73 were also assessed 24 month after surgery (62.7% LAGB and 37.3% GBP; 83% Fem) with a face-to-face clinical interview and a set of self-report measures assessing eating symptomatology, general distress, and depression.

Results: Our data show that 90.9% of pre-surgery LOC eaters remit after surgery and 15% present LOC eating “de novo” after surgery. Regarding P&N, 50% of the patients improved with surgery and 31.4% present P&N “de novo” after surgery. P&N post-surgery was a significant predictor of poorer weight loss (Wald $\chi^2(1) = .97, p < 0.05, 95\% \text{ CI} -6.23; -.68$). Post-surgery LOC eating (Wald $\chi^2(1) = 48.13, 43, p < .00, 95\% \text{ CI} 5.9; 9$), P&N (Wald $\chi^2(1) = 26.43, p < .00, 95\% \text{ CI} 28; 08$) and depression scores (Wald $\chi^2(1) = 3.95, p < .05, 95\% \text{ CI} 0.01; .08$) were significant predictors of weight regain. No pre-surgery variables were individually associated with either weight loss and weight regain. The only significant predictor of post-operative P&N was LOC eating before surgery (Wald $\chi^2(1) = 5.06, n.s., 95\% \text{ CI} -.45; -.0$). Both LAGB and GBP patients with maladaptive eating behaviors presented poorer trajectories of weight loss (see attached).

Conclusion: P&N is an understudied eating behavior that seems to play an important role in weight outcomes. Early detection of these EB might hold the key for weight regain prevention after bariatric surgery. Future research should investigate the role of these eating patterns for weight management in non-bariatric samples.

Acknowledgments: Dr. Maia da Costa, MD, General Surgery, Hospital of Braga; Dr. Isabel Brandão, MD, Psychiatry, Hospital São João.

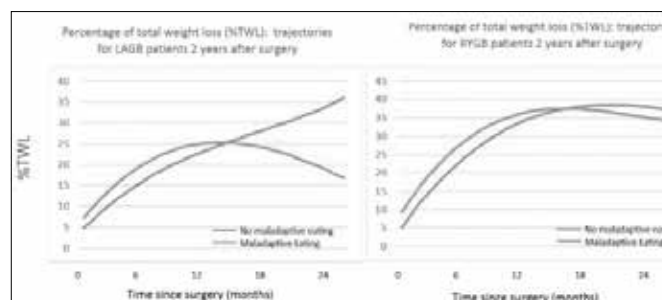


Fig. 1. These graphs depict the trajectory of total weight loss of both LAGB and RYGB patients two year after surgery.

The rs860781-MNDA SNP is associated with BMI in a GWAS in PREDIMED PLUS-Valencia participants: Replication of the BMI-results in the PREDIMED-Valencia Study and novel associations with cardiovascular mortality

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Introduction and Aims: Although dozens of genome-wide association studies (GWAs) and meta-analysis have identified hundreds of SNPs associated with body-mass index (BMI), % of variance explained by these genetic variants is still low. Though current GWAs are prioritizing high sample sizes to detect significant associations with small effects, another approach is conducting pilot GWAs in small samples with differential characteristics to detect novel SNPs having higher effects and further replication in other cohorts. Additionally, more studies are needed focusing on the association between BMI-associated SNPs and incidence of cardiovascular events. Therefore our Aims are: 1) To conduct a pilot-GWAS study in a high cardiovascular risk population to identify new SNPs suggesting associations with BMI; 2) To replicate the top-ranked BMI-associ-

ations in another cohort; and 3) To investigate the association of the most relevant BMI-associated SNP with incidence of cardiovascular diseases (CVD).

Material/Methods: We carried out a pilot GWAs for BMI associations in the first 144 participants in the PREDIMED PLUS-Valencia study (aged 65 ± 3 years and having metabolic syndrome). Genotyping was undertaken with the 700K-Human OmniExpress Illumina arrays. GWAs associations with BMI were analyzed with PLINK. The three top-ranked SNPs (P-values) were selected for genotyping and replication of the BMI-associations in participants (aged 67 ± 7 years) of the PREDIMED-Valencia Study ($n = 1094$), a randomized controlled dietary intervention trial. We investigated associations of the most relevant BMI-related SNP with the incidence of CVD events (fatal and non-fatal; $n = 44$) over a median of 4.8 y of follow-up.

Results: and Conclusions: In the PREDIMED-PLUS GWAs we identified three-top ranked SNPs associated with BMI: rs4683618 ($P = 1.0 \times 10^{-6}$); rs9314845 ($P = 3.9 \times 10^{-6}$) and rs860781 ($P = 1.6 \times 10^{-5}$). In the PREDIMED participants we replicated the significant association between rs860781, BMI and body-weight (76.0 ± 12.0 , 77.1 ± 13.0 , 79.1 ± 12.7 kg in [11, 12, 22] subjects; $P = 0.027$). This SNP is located in an intron within MNDA (Myeloid nuclear differentiation antigen) gene (Chr.1:158814834). Moreover, we detected a novel significant association between the rs860781 SNPs with fatal CVD events ($P = 0.006$). More studies are needed to confirm the relevance of this SNP on obesity and related-CVD events.

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PO1.126

Peripheral Glucose Response to the Viewing of TV Food Commercials

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Viewing television (TV) food commercials appears to prime individuals to consume greater quantities of calories; this process is thought to be exclusively psychological. The objective of the current study was to explore a potential physiological component. 23 participants (normal-weight and obese) were compared with respect to their glucose concentration in response to TV food commercials. Capillary blood samples for the determination of glucose were drawn 5 and 10 minutes prior to the presentation of a neutral film or TV food commercials, blood samples were then subsequently drawn at 5, 10 15, 30 and 60 minutes. Results: indicate that there was a significant difference for BMI and neutral film vs. TV food commercials, with a significant interaction. A significant glucose response was found at 15 and 30 minutes in obese individuals who viewed the TV food commercials, but not in other conditions. Watching TV food commercials appears to stimulate a phased glucose response in obese individuals, but a quantitatively smaller response in those of normal-weight. We explore these findings in light of Pavlovian (Pavlov, 1910) cephalic phase response. We also explore the implications of our findings on the onset and maintenance of obesity.

PO1.127

Sex and estrogen alter the action of glucagon-like peptide-1 on reward

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Background: Feeding behavior is regulated through an intricate array of anorexic and orexigenic hormones acting on the central nervous system (CNS). Some of these hormones may have differential effects in males

and females, effects potentially attributed to actions of gonadal steroids, especially estrogens. Central stimulation of the glucagon-like peptide-1 (GLP-1) receptors reduces feeding and food reward behavior by acting on CNS regions important for the anorexic actions of estrogen. Thus, we propose that the action of GLP-1 on food intake and reward may differ between sexes.

Methods: Male and female rats were centrally injected with the GLP-1 analogue exendin-4 (Ex4) in a non-deprived or food restricted state; reward behavior was measured in a progressive ratio operant conditioning task. Intake of chow or palatable food, and body weight change were also measured. To determine if sex differences in the actions of Ex4 are due to interactions with estrogen, Ex4 treatment was preceded by treatment with a nonselective estrogen receptor- α (ER α) and ER β or ER α -selective antagonist.

Results: Central injection of Ex4 revealed increased reward behavior suppression in females, compared to males, in the operant conditioning task. This increase was present in both non-deprived and food restricted animals with larger differences in the fed state. Intake of chow or palatable food, and body weight loss, after Ex4, were similar in males and females. Food reward, but not food intake, effect of Ex4 was attenuated by pretreatment with ER antagonist in both sexes, suggesting that effects of Ex4 in both sexes may be modulated by estrogen. Furthermore, central pretreatment with ER α -selective antagonist was sufficient to attenuate effects of Ex4 on reward.

Conclusions: Collectively, these data reveal that females display much higher sensitivity to the food reward impact of central GLP-1 receptor activation. Surprisingly they also demonstrate that central ER α signaling is necessary for the actions of GLP-1 on food reward behavior in both sexes.

PO1.128

The Evaluation of Adolescent Nutrition Status

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Background & Aim: World Health Organization (WHO) indicates that developed countries are facing a globesity: a global epidemic obesity. The sedentary nature of modern life, for example, the impact of computer, phone games, decline of sport activities and consumption of soft drinks and fast food contribute to current levels of obesity. Therefore, prevention and treatment of obesity in this age group is essential. Daily energy and nutrients needs are significantly increase in adolescent ages. Disruption of balance between energy intake and output and as a result of this condition, the accumulation of large amount of body fat is one of the cause of obesity. This study was planned to determine the relationship between daily intake of energy and nutrients according to body weight.

Material/Methods: This study was conducted with 710 adolescent girls aged between 15–19 years. Three consecutive days food record (1 week-end and 2 weekday consequently) were obtained from adolescent to determine food consumption by researchers. The daily average energy, macro and micro nutrient intake by adolescents were calculated from these records by BeBiS computer program which was developed for Turkey

Result: According to energy disturbance of macronutrients, while carbohydrate ($54.4 \pm 7.2\%$) was higher in overweight adolescent, protein ($17.8 \pm 4.9\%$) and fat ($36.3 \pm 6.2\%$) were higher in underweight adolescent in comparison with other groups ($p < 0.05$). Vitamin A intake of overweight adolescent was found significantly high (1372.1 ± 653.9 mcg/d; $p < 0.05$). Vitamin C, folate and iron intake of underweight adolescent was found significantly low ($p < 0.05$) (Table 1).

Conclusion: To evaluate obesity of adolescent and encouraging them for having healthy eating behaviors, attitudes, habits and for doing sportive activities could contribute to prevent them to develop obesity in later ages.

Fetal Programming of Obesity and Child Health

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In recent years, it has been overemphasized that environmental factors exposed in fetal period and early years of life can affect lifelong health status. Specially, the origins of obesity date back to early years of life and prenatal/postnatal inadequate nutritional status increases obesity predisposition. Impairment of functions in tissues, alteration in insulin secretion and sensitivity, increase in number and/or size of fat cells or alterations in adipose tissue function and alterations in appetite regulation are thought to be the main mechanisms in fetal programming. In addition to maternal obesity and gestational weight gain, gestational diabetes increases later obesity in newborn. Higher or lower gestational weight gain than the recommended values is a risk factor for obesity. Maternal hyperglycemia can cause an increase in fetal adiposity by inducing fetal insulin synthesis. In addition to obesity, the effect of maternal nutrition on asthma, renal disease and hypertension risks are emphasized. In asthma progression, protective effect of Mediterranean Diet and risk increasing effect of Western Diet are discussed. Also, the main mechanism in renal disease progression is decline in nephron number due to intrauterine growth restriction. Thus, appropriate gestational weight gain and providing daily energy and nutrient intake by adequate and balanced nutrition are strongly recommended.

Table 1. Daily intake of energy and nutrients according to weight (n = 710)

*p < 0.05 **p = 0.000 SFA = Saturated Fatty Acids, MUFA = Monounsaturated Fatty Acids, PUFA = Polyunsaturated Fatty Acids

Daily energy and nutrient intake	Underweight (n = 180) x ± SD	Normal weight (n = 460) x ± SD	Overweight (n = 70) x ± SD	p
Energy (kcal/d)	1502.9 ± 676.4	1863.0 ± 917.8	1985.2 ± 668.8	0.018*
Protein (kcal %)	17.8 ± 4.9	15.6 ± 3.3	16.9 ± 2.6	0.000**
Carbohydrate (kcal %)	46.0 ± 7.6	53.7 ± 6.8	54.4 ± 7.2	0.000*
Fiber (g/d)	17.6 ± 9.6	25.8 ± 16.4	23.9 ± 3.7	0.002*
Fat (kcal %)	36.3 ± 6.2	30.8 ± 6.6	28.7 ± 8.3	0.000**
Total fat (g/d)	58.2 ± 19.6	63.6 ± 35.8	69.6 ± 46.3	0.344
SFA (g/d)	19.9 ± 8.5	21.4 ± 13.7	23.2 ± 15.0	0.555
MUFA (g/d)	20.2 ± 6.9	20.7 ± 11.0	22.9 ± 14.2	0.453
PUFA (g/d)	13.9 ± 5.0	17.1 ± 10.7	18.5 ± 16.2	0.118
Cholesterol (mg/d)	210.0 ± 103.5	172.9 ± 149.3	213.3 ± 77.1	0.086
Vitamin A (mcg/d)	878.4 ± 475.7	904.6 ± 546.8	1372.1 ± 653.9	0.000**
Vitamin C (mg/d)	78.0 ± 22.8	91.6 ± 44.4	125.5 ± 79.9	0.000**
Folate (mcg/d)	220.5 ± 100.1	330.2 ± 181.3	364.3 ± 121.6	0.000**
Calcium (mg/d)	554.9 ± 208.2	574.1 ± 276.4	584.9 ± 477.9	0.890
Iron (mg/d)	9.6 ± 4.1	12.1 ± 6.8	12.2 ± 2.8	0.043*
Zinc (mg/d)	8.7 ± 3.3	9.8 ± 5.6	11.2 ± 3.8	0.102

Validation of a questionnaire for assessing psychosocial factors of sweetened beverages consumption in elementary school children

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Background & Aims: Psychosocial factors have a direct impact on children's eating habits, as well as encouraging sweetened beverages intake.

These combined with low physical activity has been reported to be associated with the increase in childhood obesity.

Objectives: To assess construct validity of an instrument to identify and measure the psychosocial factors that influence the consumption of sweetened beverages among elementary school children.

Material & Methods: The questionnaire consisted in 22 items and was applied to a sample of 1329 second and fourth graders from public primary schools in Tijuana (northwestern Mexico). To assess the hypothesized dimensions of the questionnaire, factorial exploratory analysis was performed. The internal consistency (Cronbach's alpha) of questionnaire items and psychosocial factors were assessed. To test the factor structure obtained in the exploratory analysis, confirmatory factor analysis was conducted in a second sample of 1541 second and fourth graders in schools from Reynosa (north of Mexico). The analysis was conducted using SPSS and AMOS.

Results: From the exploratory analysis, four factors (accessibility at home, modeling, consumer perception and accessibility outside the home) explained 49.1% of the variance. Cronbach's alpha were 0.77, 0.73, 0.71 and 0.65 for each scale. The confirmatory analysis confirmed and showed and acceptable fit of the 4-factor model.

Conclusion: The questionnaire provides a valid tool for assessing psychosocial factors which are potential determinants of sweetened beverages consumption among elementary school children.

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Differences in macronutrient profile across seven European countries (Food4Me study) and isocaloric substitution effects on BMI

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Background: The analysis of macronutrient distribution enables to associate dietary intake with specific non-communicable diseases such as obesity, diabetes, hypertension or lipid disorders. Furthermore epidemiological studies allow exploration of new relations through the study of

wide populations. The current analysis aimed to define plausible nutrient targets related with obesity prevalence.

Objectives: To analyse differences in macronutrients distribution among European countries participating in the Food4Me study, and to determine the effects of isoenergetic substitution of macronutrient sources in weight status.

Material/Methods: A total of 2411 volunteers, interested in the Food4Me study from seven European countries, were included in the current analysis. Dietary intake was assessed during screening using a validated Food Frequency Questionnaire. The analysis for differences in macronutrient intake among countries was performed with ANOVA and the estimation of relative risk ratios for overweight prevalence associated to the isocaloric substitution of different macronutrients and sources was carried out through residual method to isolate the role of each specific nutrient in the whole sample.

Results: Geographical differences in energy intake were found (Table 1), where Irish and Dutch participants reported higher daily energy consumption. Although discrepancies in macronutrient distribution were observed among all the countries, Greek participants showed greater intake of total fat and the highest intake of protein was observed in the Spanish population who also showed, together with Greeks, lower percentages of carbohydrate intake. The relative risk ratio (RRR) for overweight prevalence increased significantly with substitution of total, saturated and mono-unsaturated fat and with total and animal protein. While an isocaloric substitution of carbohydrates or vegetable protein reduced the RRR (0.98 CI95%[0.977–0.988] and 0.87 CI95%[0.84–0.90] respectively) (Figure 1).

Conclusion: The observed differences in macronutrient distribution among countries show different profiles, which could be considered as target in prospective interventions, with diverse ranks of specific macronutrient or sources to elucidate the association with the risk of obesity development.

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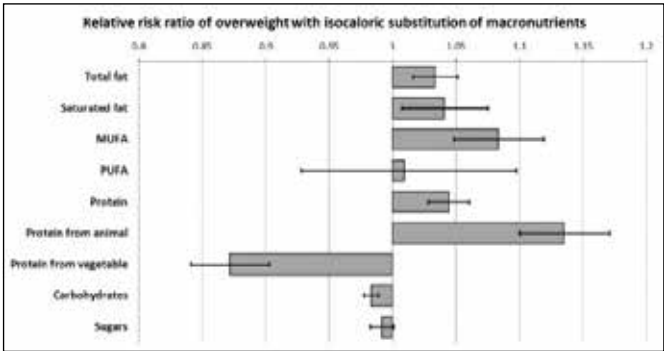


Fig.1. Relative risk ratio of overweight related with isocaloric substitution of macronutrient

	Germany	Greece	Ireland	Netherlands	Poland	Spain	United Kingdom	p ¹
n (n of females)	344 (231)	262 (180)	262 (150)	400 (231)	253 (190)	637 (388)	253 (179)	<0.001 ²
Age (years)	43.8 ±13.8	37.7 ±11.8	38.6 ±12.9	47.9 ±14.2	35.7 ±12.7	38.2 ±9.7	36.9 ±13.2	<0.001
BMI (kg/m ²)	24.3 ±3.7	26.6 ±5.8	25.3 ±4.7	24.9 ±4.2	24.6 ±4.9	25.7 ±4.8	25.0 ±4.5	<0.001
PALE ³	1.503 ±0.082	1.502 ±0.114	1.531 ±0.093	1.542 ±0.102	1.504 ±0.108	1.495 ±0.097	1.536 ±0.108	<0.001
Energy (kcal)	2488 ±686	2500 ±751	2731 ±787	2710 ±773	2558 ±807	2618 ±833	2520 ±838	0.0013
Total fat (%)	36.67 ±5.88	37.72 ±6.08	35.58 ±6.09	34.23 ±6.83	34.46 ±5.73	30.85 ±6.43	35.65 ±6.38	<0.001
Saturated fat (%)	15.39 ±3.49	14.42 ±3.42	14.45 ±3.54	13.13 ±3.29	14.47 ±3.59	13.17 ±2.85	13.88 ±3.29	<0.001
MUFA ⁴ (%)	13.41 ±2.46	15.94 ±3.96	13.01 ±2.66	12.71 ±3.22	11.86 ±2.23	14.90 ±3.70	13.39 ±3.22	<0.001
PUFA ⁴ (%)	5.79 ±1.22	5.13 ±1.06	5.65 ±1.55	6.06 ±1.49	5.77 ±1.62	5.31 ±1.34	5.91 ±1.39	<0.001
Omega3 (%)	0.61 ±0.22	0.65 ±0.22	0.79 ±0.69	0.69 ±0.23	0.69 ±0.24	0.82 ±0.26	0.78 ±0.40	<0.001
Protein (%)	15.41 ±2.64	17.30 ±3.92	16.59 ±2.98	16.51 ±2.97	16.83 ±3.28	19.16 ±3.99	16.45 ±3.26	<0.001
Protein from animal (%)	52.77 ±13.52	40.18 ±13.17	58.52 ±11.00	53.20 ±13.58	57.27 ±12.03	64.72 ±12.18	56.33 ±13.86	<0.001
Protein from vegetable (%)	35.03 ±12.93	29.59 ±11.95	31.78 ±10.61	35.59 ±12.75	31.53 ±11.51	25.27 ±10.94	31.99 ±11.91	<0.001
Carbohydrates (%)	46.65 ±7.30	44.76 ±8.16	47.32 ±8.07	47.13 ±8.55	49.23 ±7.12	44.65 ±8.57	47.11 ±8.01	<0.001
Sugars (%)	21.25 ±5.89	20.98 ±6.11	21.32 ±6.17	20.37 ±5.81	22.04 ±6.62	21.27 ±6.88	22.63 ±6.14	0.0042
Alcohol (%)	3.28 ±3.55	2.31 ±3.11	3.57 ±3.65	4.19 ±4.50	2.08 ±3.48	2.94 ±3.80	3.25 ±3.26	<0.001
Salt (g)	7.17 ±2.61	6.62 ±2.73	7.50 ±2.97	8.06 ±3.10	8.24 ±3.36	7.59 ±3.10	7.20 ±2.99	<0.001
Dietary fibre (g/1000kcal)	11.35 ±3.73	11.38 ±4.19	12.89 ±4.45	13.30 ±3.84	12.34 ±4.31	10.55 ±3.70	12.57 ±4.52	<0.001

¹ p-value for ANOVA adjusted by Age and Gender. Differences for letter show differences between groups by Bonferroni post-hoc. ² p-value for chi-square differences for distribution. ³ PALE: physical activity level factor. ⁴ MUFA: monounsaturated fatty acids. ⁵ PUFA: polyunsaturated fatty acids.

Fig. 2. to PO1.131 Macronutrient distribution by countries

A vegetable soup, pulses and bread dietary pattern is inversely associated with obesity in adult population

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Background/Aims: Dietary patterns have been suggested as a modifiable factor with impact in obesity development. We aimed to explore the association between dietary patterns and being overweight or obesity in adult population.

Material/Methods: The study included 32644 adults, 52.6% female, from a representative sample of the Portuguese population (4th National Health Survey). Body mass index (BMI) was calculated based on self-reported weight and height and categorized according to WHO classification. Dietary patterns (DP) were identified by Latent Trait models based on self-reported dietary intake at meals and snacks in the previous day. Unconditional logistic regression was performed to estimate the association between DP and being overweight or obesity (BMI \geq 25.0 kg/m²). Age, gender, education, family income, proxy reporting information, smoking and physical activity were analysed as confounders.

Results: Prevalence of obesity was 16% (class I 12.7%, class II 2.5% and class III 0.8%), 37.6% overweight, 44.6% normal weight and 0.2% underweight. Considering DP analysis, five factors were identified: F1 (“dairy and fruit”), positively correlated with milk and dairy products at meals and snacks, and negatively with fruit and alcoholic beverages at snacks; F2 (“vegetable soup, pulses and bread”), positively correlated with vegetable soup, pulses and bread at meals; F3 (“high fat, sugar and salt”), positively correlated with pastry, chocolate, desserts, candies, salty snacks, chips, fruit juices, soft drinks and alcoholic beverages at snacks; F4 (“fish, fruit and vegetables”), positively correlated with fish, vegetables and fruit at meals; and F5 (“sugary and fatty foods”), positively correlated with pastry, chocolate and desserts, at meals and snacks. After adjustment, “Vegetable soup, pulses and bread” DP was associated with being overweight or obesity (OR = 0.85, 95%CI = 0.73, 0.99). No other significant associations were observed: F1 (OR = 0.96, 95%CI = 0.86, 1.07); F3 (OR = 0.99, 95%CI = 0.89, 1.11); F4 (OR = 0.98, 95%CI = 0.84, 1.15); and F5 (OR = 1.04, 95%CI = 0.90, 1.20).

Conclusion: Our results suggest a protective association between “vegetable soup, pulses and bread” DP and being overweight or obesity, independent of socio-economic and lifestyle determinants, supporting lifestyle intervention studies in obesity based on this dietary pattern.

Effects of Probiotics Associated with Hypocaloric Diet and Physical Activity in Obese, Insulin Resistant Patients Affected by Non Alcoholic Fatty Liver Disease (NAFLD)

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Background: Non Alcoholic Fatty Liver Disease (NAFLD) is a pathology characterized by fat accumulation in hepatocytes and it affects 20–30% of adult population. The probability of encountering this pathology in-

creases in presence of obesity, insulin resistance, diabetes and dyslipidemia. One of the main therapeutical ways for curing NAFLD is modifying alimentary habits and life style. Probiotics can change the composition of the intestinal gut and module pathways of inflammation of the liver, contributing to improve the physiological state associated to NAFLD.

Objectives: To evaluate the effects of a probiotic product (Liverton Siphra) intake in a metabolic panel (transaminases ALT and AST, and insulin resistance by HOMA) and in an antropometric panel (BMI – Body Mass Index and waist circumference) applied to the patients previously described..

Material/Methods: 40 subjects with severe obesity have been recruited and evaluated for insulin resistance, non-alcoholic fatty liver disease and with elevated transaminases, hospitalized in the Department of Nutritional Rehabilitation Hospital of San Pietro, Ponte San Pietro (BG), Italy. The whole sample of participants was divided in two groups. One of them followed a hypocaloric diet, physical activity and received a probiotic treatment, which consisted in administering two capsules per day with 18 billion live cells of Lactobacillus Paracasei F19 for 28 days (Liverton – Siphra). Whilst, the other one followed the same hypocaloric diet and physical activity only. The data analysis has been run through the used of STATA13, a statistical software.

Results: It has been observed that ALT transaminases variables (12.4 ± 16.3 U / L vs 7.4 ± 13.7 U / L), AST transaminases variables (5.7 ± 6 U / L vs 5 ± 8.7 U / L) and HOMA Index (0.9 ± 1.4 vs 0.5 ± 0.6) had higher reduction in the group treated with probiotics.

Conclusions: Probiotics are helpful in improving NAFLD. This is dictated by the fact that they have many positive effects on the general gut condition.

The nutritional quality of combinations of foods commonly consumed in a western-style diet is not improved by increasing the variety of these foods

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Introduction The aim was to evaluate the impact of food variety on nutritional quality using combinations of foods characteristic of ideal menu-plans (IMP) or western-style diets (WSD).

Methods: Seven combinations of random foods were constructed for two IMPs (MyPlate and DASH) and for foods commonly consumed in a WSD (Smiciklas-Wright et al 2003). No food was selected more than once per combination. The portion sizes were those in the IMPs, or as-consumed (WSD), with a target of 2,000 Kcals per combination. Nutrient compositions were derived using the USDA nutrient database (Release 27). Nutritional quality was assessed using the Nutritional Balance Concept (Fern et al 2015). This comprises the proportion of recommended upper limits for 6 nutrients of concern for health in excess (Disqualifying Index, DI), the proportion of RDA for 27 nutrients important for health (Qualifying Index, QI) and the arithmetic mean of truncated (values > 100%) and non-truncated QI values (values < 100%) (Nutrient Balance, NB). The impact of food variety on nutritional quality was assessed by: 1. Reducing the portion size of foods in the WSD combinations by 25% energy and adding further WSD foods to reach 2,000Kcal. 2. Diluting the 7 WSD food combinations with IMP combinations in 7 steps.

Results: Random combinations of foods from IMPs are of higher nutritional quality (QI and NB but not DI) than combinations of foods randomly selected from a WSD (ANOVA). Increasing the number of different foods in a WSD combination had no effect on nutritional quality (two-sample t test); Table 1. Diluting WSD combinations with IMP foods was associated with a linear increase in nutritional quality; Table 2.

Conclusion: This model suggests that increasing the variety of foods in a WSD does not increase nutritional quality, but replacing foods commonly consumed in WSDs with foods from IMPs improves nutritional quality.

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Table 1. Nutritional quality of random combinations of foods; Values are mean \pm SD; n = 7

	Number of food items	Energy (Kcal)	DI	QI	NB
MyPlate	20 \pm 4	1958.50 \pm 69.28	0.76 \pm 0.17	1.61 \pm 0.20	87.31 \pm 3.30
DASH	32 \pm 8	1998.64 \pm 68.26	0.82 \pm 0.10	1.45 \pm 0.13	84.57 \pm 3.98
WSD	15 \pm 2	1957.11 \pm 85.69	0.93 \pm 0.28	1.09 \pm 0.24	75.13 \pm 8.47
Increased-variety WSD	20 \pm 3	1998.96 \pm 65.11	0.95 \pm 0.20	1.02 \pm 0.17	75.44 \pm 6.25

Table 2. Associations between nutritional quality and dilution of WSD food combinations by foods from IMPs

	DI	QI	NB
WSD dilution in 7 steps by MyPlate	$y = -0.0305x + 1.009$ $R^2 = 0.8745$	$y = 0.0825x + 0.973$ $R^2 = 0.9687$	$y = 1.5262x + 80.497$ $R^2 = 0.9546$
WSD dilution in 7 steps by DASH	$y = -0.0273x + 0.968$ $R^2 = 0.8667$	$y = 0.0479x + 0.996$ $R^2 = 0.9204$	$y = 0.8087x + 79.019$ $R^2 = 0.8066$

PO1.135

Low Phosphorus and Calcium serum levels in a population of severely obese women: A preliminary study

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Background & Aims: Energy dense low nutritional value diet, typical of western and westernized societies, tends to be poor in phosphorus (P) content; serum P levels have been reported to be inversely related to body weight.

Objectives: The study compares P and calcium (Ca) levels in a population of obese patients and in normal weight/overweight subjects.

Material & Methods: This study involved 681 women divided in two groups: 1) 555 severely obese (OB) with (age 33.7 \pm 10.4 years; weight 122.7 \pm 22.1 kg; BMI 30.7–86.6 Kg/m²) and 126 non-obese (nonOB) with (age 23.7 \pm 6.9 years; weight 58.5 \pm 6.7 kg; BMI 20.0–29.4 kg/m²); serum P and Ca levels were measured.

Results: Serum P levels (normal range 3.0–4.5 mg/dL) were low in 18% OB and 3.9% in nonOB ($p < 0.05$), whilst was high in 4.1% OB and 17.1% in nonOB ($p < 0.05$). Serum Ca levels (normal range 8.9–10.3 mg/dL) were low in 8.8% OB and 3.2% nonOB ($p < 0.05$) high in 1.3% OB and 9.7% in nonOB ($p < 0.05$).

Conclusion: In this preliminary study and according to the literature, a higher prevalence of hypophosphatemia and hypocalcemia were observed in OB compared to nonOB women. Further investigations are needed to confirm a possible relationship between serum P and Ca levels, dietary habits and obesity.

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PO1.136

Evaluation of Compliance with Mediterranean Diet Quality Index (KIDMED) in Toddlers and Adolescents

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Background & Aims: Mediterranean diet is a healthy nutritional model which its effect in preventing chronic diseases is proven. KIDMED, a scale for determining healthy nutrition and diet quality, can be applied in children and adolescents. So, this study was conducted and carried out to compare diet quality of toddlers and adolescents by using KIDMED.

Material/Methods: Two thousand one hundred thirteen children aged between 4–6 years (n = 1337, 63.3%) and 12–14 years (n = 776, 36.7%) participated this study. A questionnaire was applied to children by face to face interview. KIDMED index which consist of 16 items was used for evaluating diet quality. Diet quality was classified as very poor (≤ 3 points), average (4–7 points) and optimal (≥ 8 points).

Results: Mean total KIDMED score was 6.51 \pm 2.20 in 4–6 age group, 5.74 \pm 2.33 in 12–14 age group and the difference was statistically significant ($p = 0.000$). According to classification of KIDMED scores, diet quality was 9.4% very poor, 56.3% average and 34.3% optimal in 4–6 age group. These values were 16.8%, 59.5% and 23.3% in 12–14 age group, respectively. While percent of toddlers with very poor diet quality was low, percent of toddlers optimal diet quality was high compare with adolescents ($p = 0.000$). When comparing differences between groups according to items of KIDMED, the differences were mainly based on “goes more than once a week to a fast-food (hamburger) restaurant” “has fresh or cooked vegetables regularly once a day” and “consumes fish regularly (at least 2 or 3 times a week)” ($p = 0.000$). Mother’s ($r = 0.081$, $p = 0.025$) and father’s ($r = 0.072$, $p = 0.046$) education status effect diet quality in 12–14 age group but it was not effective in 4–6 age group.

Conclusion: Diet quality is changed with effect of social environment and individualization of nutrition with increased age. Education of children and parents about healthy nutrition by specialist, check and repeat frequently contributed to increasing diet quality and preventing of chronic disease

PO1.137

Effect of whole-grain pasta on subjective appetite and food intake in overweight/obese participants

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Background & Aims: Wholegrain (WG) foods are gaining consideration due to their beneficial effects on health. Many studies evaluated the effect on appetite between meals (satiety), but the effect within meal (satiety) has not yet been studied.

Objectives: Aim of this study was to investigate the effect of WG pasta (WGP) compared to refined grain pasta (RGP), on ad libitum energy intake (EI) within and at the subsequent meal as well as on subjective appetite and breath hydrogen excretion in overweight/obese participants.

Material/Methods: A randomized crossover study was designed to test two different ad libitum lunch meals (study A) as well as two different iso-caloric lunch meals (study B) in sixteen overweight or obese subjects (7M:9W; BMI = 30.1 \pm 2.8 kg/m²). The test meals consisted of RGP and WGP served with tomato sauce. Study A: the ad libitum lunch meal was consumed and EI registered. Study B: the iso-caloric lunch meal was served and hereafter, subjective appetite sensation and breath hydrogen

excretion were assessed for 240 minutes followed by an ad libitum meal to assess EI.

Results: Study A: WGP and RGP did not differ significantly on ad libitum EI within meal ($p = 0.23$). Study B: WGP resulted in increased sensation of satiety ($p < 0.001$), and lower ratings of prospective food consumption ($p < 0.001$), without increasing significantly breath hydrogen excretion compared to RGP. Still, no difference was shown on ad libitum EI at the subsequent meal ($p = 0.12$), nevertheless a significant difference was found in men (WGP: 2255 ± 1057 vs. RGP: 2757 ± 1274 kJ; $p < 0.05$).

Conclusion: WGP increased satiety and diminished prospective food consumption, without affecting ad libitum EI. However, the observed sex-differences need to be investigated further in future studies.

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PO1.138

White rice consumption, independent of overall dietary patterns, is associated with general and central obesity: Analysis of adults in southwest China

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Introduction: White rice is a major staple food of the Asian people and dietary patterns characterized by high intake of white rice were found to be associated with obesity. However, to our knowledge, no study has examined whether white rice consumption is associated with obesity independent of overall dietary patterns in Chinese population, especially in people from southwest China, who are known to consume large quantities of white rice.

Methods: In this cross-sectional study of 937 adults (56% men) aged 20–70 years, dietary data was obtained using a 66-item food frequency questionnaire. Waist circumference, body weight and height were measured. General obesity was defined as $\text{BMI} \geq 28.0 \text{ kg/m}^2$ and central obesity was defined as waist circumference $\geq 85 \text{ cm}$ in men and $\geq 80 \text{ cm}$ in women. Factor analysis was used to identify dietary patterns and logistic regression models were performed to examine the association between white rice consumption and obesity.

Results: The prevalence of general and central obesity was 11.4% and 60.9% respectively. There was an interaction between gender and the relation of white rice consumption with general and central obesity. After adjusting for age, personal monthly income, education, smoking pack-years, moderate-to-vigorous physical activity, energy intake and dietary pattern scores, men whose diet was in the highest white rice tertile had a lower risk of general obesity ($\text{OR} = 0.41$, 95%CI: 0.18–0.96) and central obesity ($\text{OR} = 0.53$, 95%CI: 0.30–0.95) than men in the lowest tertile. However, association between white rice consumption and obesity was not observed among women.

Conclusions: Men, but not women, with higher white rice consumption had a lower risk of both general obesity and central obesity.

PO1.139

Connection between water intake and the BMI of elderly people

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Backgrounds & Aims: Appropriate hydration is requirement for health. Although EFSA's recommendation for daily water intake does not change

with aging but the risk of dehydration increases considerably in old age because of reduced thirst and deteriorating physical abilities.

Objectives: The aim of this study is to evaluate total fluid intake provided by different types of beverages and food in a sample of Hungarian elderly people living in nursing homes in order to assess the percentage of individuals complying with the EFSA recommendations for total fluid intake, the factors influencing their water intake and the connection between the BMI and the water intake.

Material/Methods: Interviews with a special questionnaire among elderly people. The interviews were done by dietitians and students. The study was carried out in summer, 2014. Statistical analysis was performed using the SPSS 17.0. Percentages were used to describe all the qualitative variables. Comparisons were done using Chi-squared test.

Results: A total of 140 interviews were completed. Mean total water intake was 1,8 l for men and 1,7 l for women, far from the “adequate Intake” set by the EFSA, 2,5 l (for adults men) and 2 l (for adult women), respectively. Based on the Body Mass Index calculated from height and weight, 44% of senior people were overweight; their BMI among those between 60 and 65 years of age was significantly higher (28,9) than the average (27,1). The underweighted elderly consumed less water (1,5 l) than overweighted (1,84 l). This difference comes from the consumption of water and other beverages (without food).

Conclusion: Our study points out that water intake by the institutionalised elderly people remains well below the recommended daily amount of water intake. There is a connection between the BMI and the total water intake. Given the potential health consequences, intervention involving family members and health care professionals to promote fluid consumption seems to be necessary.

PO1.140

Mediterranean Diet and Obesity in adults

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Background & Aim: The Mediterranean Diet (MedDiet) is associated with protection from numerous diseases, including cardiovascular. However, their relationship with obesity is not yet clear. The aim of this study was to evaluate the association between MedDiet and obesity in a sample of adults.

Methods: This sample consisted of 248 adults. The adherence to MedDiet was assessed applying the instrument PREDIMED (PREvención com Dieta MEDiterránea). Weight (kg) and height (cm) were evaluated using standards procedures and calculated the BMI (kg/m^2). To evaluate the nutritional status and define obesity it was used the WHO classification.

Results: This sample had 68.1% ($n = 169$) women and had a mean age of 49.1 (± 15.6) years. In this sample, 7.7% had good adherence to MD, and the average rate of adherence was 6.3 (± 2.0). Overweight level of 45.6% and obesity of 22.9% were found. Relating the adherence to MedDiet to obesity, we found that most obese (96.5%) had no MedDiet and that most of those who had a MedDiet (89.5%) were not obese, but without statistical significance.

Conclusion: In this sample was not found association between adherence to MedDiet and obesity, being important to develop further studies, with large samples, to clarify the relationship.

PO1.141

Clinical, nutritional and environmental characteristics of a sample of NAFLD Lebanese patients

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Objectives: The objective of this study was to evaluate the nutritional profile of 320 Lebanese non-alcoholic fatty liver disease (NAFLD) patients and to find out significant variations in clinical, nutritional and environmental parameters with the presence or not of fibrosis according to NAFLD fibrosis score (NFS).

Methods: Over 36 months, 320 NAFLD Lebanese adult patients (212 men and 108 women) were recruited. A validated questionnaire (Harvard Nurses' health study, 2010) translated in Arabic and two 24-hour recalls (week day and week-end day) were administered. Anthropometric measures, blood pressure and biological markers were also obtained.

Results: 83.4% of patients had more than three parameters of metabolic syndrome and 60.8% were obese (BMI ≥ 30). 97.7% of the sample had calories intake/day that were higher than 2/3 of the daily recommended intake (DRI) while 81.6% and 100% had an omega 3 (g), EPA (mg) and DHA (mg) consumption/day that were lower than 2/3 of the DRI respectively, $P < 0.05$. On multiple logistic regression analysis, waist circumference (cm) was the main independent predictor of fibrosis after adjustment with covariables (OR 1.14; 95% CI, 1.03–1.26), $P = 0.010$.

Conclusion: A high prevalence of obesity, mainly abdominal and metabolic syndrome parameters was observed in the sample. This study highlighted the poor consumption of the NAFLD Lebanese population of food rich in omega 3, EPA and DHA.

PO1.142

Dietary patterns and physical activity of obese children aged 5–10 years in context of their families' lifestyle

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Background: According to the epidemiological data (WHO 2014), one third of European children are obese. There are many factors involved in aetiology of childhood obesity, but in many cases excess weight is a result of overeating and under-exercising. Aim. Analysis of dietary patterns and physical activity of obese children aged 5–10 years in context of their families' lifestyle

Material and Methods: The study covered 70 obese children (BMI z-score $> 2SD$) aged 5–10 years. Children were recruited in primary care outpatient clinics in Mazovian Voivodeship. The comprehensive assessment of dietary patterns and leisure time activities of studied children and their families was based on data obtained with a questionnaire survey.

Results: The studied group ($N = 70$) consisted of 28 girls and 42 boys with simple obesity. They came mainly from families with high socioeconomic status – both parents with upper-secondary or higher education ($> 90\%$), employed (91.4%) and declaring satisfactory level of income (70.0%). The number and frequency of meals was congruent with the safe nutrition model, but children ate irregularly and were rarely accompanied by other family members. We observed snacking in 96% of cases. Obese children had improper food choices. In 80% of group the daily diet was based on white bread, butter, cheese, cold meats and sweet beverages, 40% ate sweets every day. Two thirds of parents described family physical activity as irregular and occasional. Half of studied children exercised only during gym classes. In 75% of children screen time exceeded 2 hours a day.

Conclusion: Family-based intervention to promote healthy lifestyles in obese prepubertal children should involve modification of dietary patterns of whole family (regular meal frequency, elimination of snacking, healthy food choices) as well as reduction of sedentary behaviours and introduction of scheduled physical activity into the daily family routine.

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PO1.143

The association between adherence to the Mediterranean dietary pattern, body mass index and weight status among high-school female students aged 15–18 years in Iran

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Introduction: According to high prevalence of overweight and obesity in Iran and the socioeconomic burden of obesity, defining a healthy diet that can prevent weight gain is essential. This study aimed to determine the relationship between adherence to Mediterranean dietary pattern (MDP) with body mass index (BMI) and weight status (WS) in female adolescents aged 15–18 in Tehran.

Materials/Methods: In this cross-sectional study, 280 female adolescents from high schools in Tehran (sampled by Multi-stage stratified cluster sampling) were recruited. General information, physical activity and food frequency questionnaires were completed. Weight, height, waist circumference (WC), hip circumference were measured. BMI and waist to hip ratio (WHR) were calculated. Mediterranean style dietary pattern score (MSDPS) was calculated. Relation between adherence to MDP with BMI, WC and WHR were analyzed using Bon-ferroni correction.

Results: Prevalence of overweight, obesity, central obesity (based on WC) were 12.2%, 16% and 38.4% respectively. Mean \pm standard deviation of MSDPS was 15.99 ± 5.64 and generally it was low in this population. Adherence to the MDP was positively associated with mother's education level and energy intake ($p < 0.05$). No relation was observed among MSDPS and WS and BMI among adolescents.

Conclusion: Adherence to MDP among adolescent females in Tehran is low. There is no association between adherence to the MDP and BMI among participants. Although mother's level of education has a positive effect on compliance.

PO1.144

Does breastfeeding reduce the risk of childhood obesity?

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Introduction: Breast milk is the optimal feeding choice for infants. Breast-feeding may be an important protective factor against the development of obesity. Breastfeeding could protect by encouraging the infant's emerging motor capabilities and self-regulation of intake, reducing the problem of feeding behaviors, providing bioactive factors that regulate energy intake and energy expenditure. Infants, who were breastfed for longer periods than infant formula, had a lower risk of being overweight during childhood and adolescence. Adequate breastfeeding protects against childhood adiposity and reduces the adiposity levels and also it is associated with significantly lower body mass index (BMI), waist circumference, visceral and subcutaneous abdominal fat at ages 6–13 years (1). Higher oligosaccharides diversity supply a reduction in fat mass at first months (2). TNF- α concentration

in breast milk is associated with lower lean mass and IL-6 concentration is negatively associated with infant growth and adiposity. (3)

Conclusion: and suggestions: More-rapid increases in weight for length in the first 6 months of life were associated with sharply increased risk of obesity at 3 years of age. Supporting mothers for breastfeeding at least 6 months of age may be protective against increased adiposity in childhood, adolescence, and young adulthood. 1. Crume, T. L., Ogden, L., Maligie, M., Sheffield, S., Bischoff, K. J., McDuffie, R., & Dabelea, D. (2011). Long-term impact of neonatal breastfeeding on childhood adiposity and fat distribution among children exposed to diabetes in utero. *Diabetes care*, 34(3), 641–645. 2. Alderete, T. L., Autran, C., Brekke, B. E., Knight, R., Bode, L., Goran, M. I., & Fields, D. A. (2015). Associations between human milk oligosaccharides and infant body composition in the first 6 mo of life. *The American journal of clinical nutrition*, 102(6), 1381–1388. 3. Fields, D. A., & Demerath, E. W. (2012). Relationship of insulin, glucose, leptin, IL6 and TNFα in human breast milk with infant growth and body composition. *Pediatric obesity*, 7(4), 304–312.

PO1.145

Review of intensive weight management with Low energy liquid diet in Type 2 Diabetes

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Introduction Background: About 53% of Type 2 diabetes patients need insulin therapy to achieve glycaemic control in 6 years on oral hypoglycemics (1). However, insulin therapy inevitably cause weight gain (2,3). Insulin treated patients find difficult to lose weight (4) partly due to potential hypoglycaemia and mismatch of meal and insulin. Intervention: We retrospectively reviewed insulin dependent type 2 diabetic obese patients with BMI > 35 (n = 20) who underwent intensive weight management programme with low calorie liquid diet (800 Kcal /day) under multidisciplinary supervision and estimated their insulin requirements, weight changes and diabetes control.

Results: At baseline weight, BMI, HbA1c and insulin requirement were recorded. Over average of 4 months, mean weight loss 14.24kg (21.6+/- SD), HbA1c changes 11.25mmol/mol (24.4+/- SD), insulin requirement reduction 76Units (42.7+/- SD) was achieved. 3 patients able to come off from insulin completely. Average insulin requirement dropped by 59%. Only three patients had higher HbA1c (one being on oral steroid for other medical condition, one was with type 1 who lost 21.0 kg (BMI dropped from 36 to 29).

Conclusion: Low Energy Liquid is safe for type 2 diabetes patients treated with insulin under close supervision of a specialist team including diabetologist, dietitians and specialist nurses. Weight loss intervention in this

cohort of patients is essential for achieving better glycaemic control which is clearly demonstrated superior to continual increasing insulin doses which invariably results in weight gain.

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PO1.146

Determination of Relationship Between Mediterranean Diet Score With Body Composition in Overweight and Obese Women

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Aim: This study was conducted with women who are overweight and obese consulted to Iskenderun State Hospital Nutrition and Dietetics Department between the dates April 2014-December 2014.

Materials/Methods: This study was conducted on total of 252 women aged between 20–50 years who don't have any diagnosed chronic diseases other than obesity by internal specialist and whose body mass index were ≥ 25 - < 40 kg/m². Body weight, waist, hip and neck circumferences (cm) were taken from all participants, body mass index (BMI), waist-to-hip ratio and waist-to-height ratio were calculated.

Results: At the end of the study, it was determined that the mean Mediterranean diet score was found 7.53 ± 1.73 . The mean body mass index of individuals' was calculated as 31.7 ± 4.13 kg/m². The mean waist circumference was found 99.8 ± 9.27 cm. It was found that the Mediterranean diet score increased while body weight and body mass index of the individuals' significantly reduced ($p < 0.05$). Body fat mass, muscle weight, body water, waist and hip circumferences and waist-to-height ratio significantly reduced with increasing compliance with the Mediterranean diet ($p < 0.05$).

Conclusion: According to results of this study, adherence to the Mediterranean diet may have positive effects on body mass index, body composition and blood triglyceride levels in overweight and obese subjects.

Table 1. to Po1.146 The body composition of the participants' by compliance with the Mediterranean diet

*: Q1: 1st Quartile, Q2: 2nd Quartile, Q3: 3rd Quartile, Q4: 4th Quartile **p < 0,05 ***Kruskal -Wallis test

	Mediterranean Diet Scores	Mediterranean Diet Scores	Mediterranean Diet Scores	Mediterranean Diet Scores	Mediterranean Diet Scores	Mediterranean Diet Scores
Anthropometric measurements	Q1* x ±SS	Q2* x ±SS	Q3* x ±SS	Q4* x ±SS	Total x ±SS	p***
Height (cm)	160,8 ± 5,43	161,1 ± 4,08	159,6 ± 5,04	160,6 ± 4,96	160,6 ± 4,89	0,581
Body weight (kg)	86,1 ± 12,49	84,9 ± 10,36	79,5 ± 11,84	77,6 ± 10,54	81,9 ± 11,78	≤0,000**
Body mass index (kg/m ²)	33,2 ± 4,31	32,6 ± 3,68	31,1 ± 3,94	30,2 ± 3,87	31,7 ± 4,13	≤0,000**
Body fat ratio (%)	39,33 ± 4,33	39,86 ± 4,33	37,18 ± 5,17	37,11 ± 4,31	38,37 ± 4,64	≤0,000**
Fat mass (kg)	34,3 ± 8,50	34,1 ± 7,24	30,0 ± 8,47	29,1 ± 7,04	31,8 ± 8,07	≤0,000**
Muscle mass (kg)	49,1 ± 4,35	48,2 ± 4,06	46,9 ± 3,95	46,0 ± 4,11	47,5 ± 4,29	≤0,000**
Body water (kg)	37,9 ± 3,39	37,1 ± 3,22	36,2 ± 3,06	35,4 ± 3,18	36,6 ± 3,34	≤0,000**
Basal metabolic rate (kcal/d)	1606,5 ± 154,68	1575,4 ± 137,13	1523,2 ± 135,02	1491,8 ± 134,59	1547,2 ± 147,10	≤0,000**
Waist circumference (cm)	103,0 ± 8,74	102,0 ± 9,35	97,4 ± 8,48	96,8 ± 8,87	99,8 ± 9,27	≤0,000**
Hip circumference (cm)	118,6 ± 8,94	117,6 ± 7,82	114,5 ± 9,14	114,0 ± 8,27	116,1 ± 8,68	0,003**
Waist to hip ratio	0,87 ± 0,05	0,87 ± 0,07	0,85 ± 0,06	0,85 ± 0,06	0,86 ± 0,06	0,115
Waist to height ratio	0,64 ± 0,05	0,63 ± 0,06	0,61 ± 0,05	0,60 ± 0,06	0,62 ± 0,06	≤0,000**
Neck circumference (cm)	36,7 ± 2,38	35,9 ± 2,42	35,2 ± 1,77	35,2 ± 2,27	35,7 ± 2,32	≤0,000**

PO1.147

Orthorexia Risk Were Higher In Female With Lower Body Mass Index

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Introduction: Orthorexia nervosa describes a pathological situation about consuming healthy foods that is characterized by avoidance of foods believed to be unhealthy. It is believed that orthorectic individuals tend to be more underweight.

Methods: The study was carried out on 750 healthy male and female participants aged 19–50 years. ORTO-15 test was performed and body weight (kg), height (cm), waist and hip circumference (cm) was measured. Waist/hip ratio were divided into groups according to the WHO classification.

Results: The BMI values were determined as $23.9 \pm 3.47 \text{ kg/m}^2$ and $22.7 \pm 4.46 \text{ kg/m}^2$ and mean ORTO-15 scores were 38.9 ± 3.31 and 39.2 ± 3.25 for male and female participants respectively. According to waist/hip ratio, 59.5% of male and 33.1% of female have higher chronic disease risk. For female participants a positive weak correlation was observed between ORTO-15 scores and BMI ($r = 0.143$; $p < 0.05$). There was also a positive significant correlation between ORTO-15 scores and waist/hip ratio in female participants ($r = 0.116$; $p < 0.05$). ORTO-15 scores were lower in non risk female group according to waist/hip ratio ($p < 0.05$). There were not found any significant result for male.

Conclusion: In this study we found that orthorexia risk were slightly higher in BMI lower female participants. It could be due to the obsession to healthy food choices especially female participants; but eating disorders risk must be taken into account. Further investigations will be beneficial in order to understand the reason underlying this results.

PO1.148

Dietary variability and its relationship to the development of obesity

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Introduction: Numerous campaigns have been designed to prevent the increasing prevalence of obesity and the related comorbidities. While dietary recommendations constitute – in addition to physical exercise programs – a main component of intervention studies for weight reduction, less is known about the eating behavior in the general population. It was therefore the aim of our evaluation to define long-term changes in food intake and dietary variability in a cohort of patients admitted to a clinical center in central Europe, as well as the relationship to body mass index (BMI) and morbidity.

Methods: Clinical and laboratory data from a total of 15 774 patients women $N = 9208$ age $52.69 (\pm 20.28)$ years; BMI $23.85 (\pm 4.78) \text{ kg/m}^2$; male $N = 6566$ age $55.12 (\pm 18.34)$ years; BMI $25.51 (\pm 4.01) \text{ kg/m}^2$ were admitted during 1995 up to December 2015. A semi quantitative food frequencies questionnaire including 51 items was repeatedly handed out ($n = 9313$) to the patients from 2005 to 2015. Regarding to the BMI development in our study population a collective in the fourth age decade was chosen.

Results: During the whole observations period of 20 years we could not find significant changes in BMI values. Daily calorie intake increased n.s., fat intake as well as food variability increased significantly. In our longitudinal observation, patients reported about an increase in the intake of cereals, grains, fruits, nuts, but also beef, cheese and cookies.

Conclusion: Our data supports the importance of dietary variability in the maintenance of body weight and possibly prevention of obesity.

PO1.149

Is Healthy Eating Index Related With Waist Circumference In Adults?

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Introduction: Healthy eating index 2010 (HEI-2010) is a valid tool which the amounts and variety of foods consumed can be considered. Diet quality is a component of life quality and number of main meal, smoking and anthropometric measurements are important for overall life quality.

Methods: This study was conducted with equal number of male and female subjects (750 subjects). Participants' 24 hour food recall were obtained and HEI-2010 was calculated. Number of main meal and smoking status was questioned. Body weight (kg), height (cm), waist and hip circumference (cm) were measured. Body mass index (BMI) and waist/hip ratio were divided into groups according to the WHO classification.

Results: Mean age of male and female participants was 25.9 ± 6.60 and 25.6 ± 6.82 years respectively. Mean HEI score was 64.6 ± 9.22 and there was no statistically significant differences between sex groups ($p > 0.05$). In female, it was observed as the number of main meal increased, HEI scores decreased ($r = 0.110$, $p < 0.05$). Furthermore, there was a positive correlation between age and HEI scores in female ($r = 0.208$, $p < 0.05$). In male there was a negative correlation between waist circumference and HEI score ($r = -0.005$, $p < 0.05$). Also there was a negative correlation between number of cigarettes and HEI scores ($r = -0.42$, $p < 0.05$). HEI scores were higher in chronic disease risk group according to waist/hip ratio in female ($p < 0.05$). No significance were observed according to BMI groups for HEI scores ($p > 0.05$).

Conclusion: As a result, in this study it was found that HEI is related with life quality parameters. With aging, the increase in HEI scores can be related with awareness of this issue. Since there was conflicting results in terms of waist circumference and waist/hip ratio among sex groups, it was thought that the relationship between anthropometric measures and HEI scores is not clear.

PO1.150

Beyond combination of other healthy lifestyle factors: Dietary pattern is associated with body composition among adults in southwest China

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Introduction: Diet, as an important lifestyle factor, has been suggested to play a major role in obesity. However, health-related lifestyle factors naturally cluster and a combination of healthy lifestyles seem to be a stronger predictor of obesity than each individual lifestyle factor alone, which may confound the real association between diet and obesity. Therefore, we aimed to explore whether diet is associated with obesity independent of combination of other healthy lifestyles, including exercise, stress and sleep.

Methods: Factor analysis was used to identify dietary patterns from a 66-item food frequency questionnaire. Body weight, height, waist and hip circumference as well as skin-fold thicknesses were measured to calculate body mass index (BMI), waist to hip ratio (WHR) and percentage body fat (%BF), as measures of body composition in our study. Data on socio-demographic and lifestyle factors was collected using validated questionnaires and cumulative health lifestyles were computed by considering moderate-to-vigorous physical activity, stress and sleep quality. Multivariate linear regressions were performed in 800 Chinese adults (62% men) aged 20–70 years.

Results: There was no interaction of cumulative health lifestyles with the relations of dietary pattern to body composition. 'Health' dietary pattern, characterized by high intakes of whole grains, mushrooms, fruits, vegeta-

bles and potatoes, was associated with lower BMI, WHR and %BF in both gender (all $p < 0.04$), after adjusting for age, family average monthly income, smoking pack-years, energy intake and cumulative health lifestyles. 'Macho' dietary pattern, characterized by high intakes of various kinds of alcohol, beverage and animal foods, was positively associated with BMI, WHR and %BF among men (all $p < 0.02$). Women whose diet was in the highest 'Sichuan' dietary pattern (characterized by high intakes of rice, red meat and pickles) tertile had higher BMI, WHR and %BF than women in the lowest tertile (all $p < 0.04$).

Conclusions: Our data suggested that dietary pattern is associated with body composition independent of combination of other healthy lifestyle factors.

PO1.151

Technology Based Dietary Assessment Tool in Early Pregnancy

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Background & Aims: Given the importance of maternal diet in fetal development and in lifelong health outcomes ⁽¹⁾, accurate dietary assessment and interpretation is important for the derivation of efficacious, evidence-based nutritional interventions. In this context, dietary quality indices in pregnancy should be explicitly underpinned by data correlating food intake patterns with nutrient intakes known to be important for gestation. Our aim was to assess the correlation between scores derived from a novel online Dietary Assessment Tool (DAT) and nutrient intake data derived from the previously validated Willett Food Frequency questionnaire (WFFQ).

Materials & Methods: Women completed the validated WFFQ and online DAT questionnaire in their first trimester.

Results: Positive correlations were observed between respondents' ($n = 402$) diet and nutrition scores derived from the online DAT, and their folate, vitamin B12, iron, calcium, and zinc intakes/MJ of energy consumed derived from the WFFQ (all $P < 0.001$). Negative correlations were observed between participants' diet and nutrition scores and their total energy intake ($P = 0.04$), and their percentage energy from fat, saturated fat, and non-milk extrinsic sugars (NMES) (all $P \leq 0.001$). Median dietary fibre, beta carotene, folate, vitamin C and vitamin D intakes derived from the WFFQ, generally increased across quartiles of diet and nutrition score (all $P < 0.001$).

Conclusions: Scores generated by this web-based dietary assessment tool correlate with important nutrient intakes in pregnancy, supporting its use in estimating overall dietary quality among obstetric populations. The technological advantages and potential interactive aspect of the DAT make it useful for collecting dietary information and could be linked to individualised advice on dietary intakes and lifestyle behaviours.

Acknowledgments: This work was partially funded by an unlimited educational grant from Danone which we acknowledge with gratitude. We also acknowledge with gratitude the participation of the pregnant women.

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PO1.152

Effect of Eating Behaviours in Different Emotional States on Obesity

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This research was conducted to evaluate the effect of eating behaviours in different emotional states on obesity. It was conducted on 610 young

adults (19.9 ± 1.63 years), 338 men and 272 women in Ankara/Turkey. Changes in eating behaviours (I do not eat at all, I eat less than normal, I eat normally, I eat more than normal) of individuals in different emotional states (sad, happy, stressed, angry) were questioned with a survey form. Anthropometric measurements of individuals were taken and BMI values calculated. Accordingly participants stated that 39% they eat less than normal, 23% do not eat at all and 11% eat more than normal when they are sad. Overweightness/obesity frequency in individuals who eat more than normal, who eat normally, who eat less than normal and who do not eat at all is respectively 29.9%, 23.6%, 17.6% and 15.7%. There was a statistically significant correlation between eating behaviours in sadness and BMI groups ($\chi^2:15.488$, $p < 0.05$). Sixty five point nine percent of the individuals have stated that they eat normally, 16.1% eat more than normal and 11.6% eat less than normal when they are happy. Frequency of individuals who do not eat at all, who eat less than normal and who eat more than normal when they are stressed is respectively 24.4%, 39.5% and 16.1%. Frequency of overweightness/obesity in individuals who eat less than normal, who eat normally and who eat more than normal when they are stressed is respectively 14.5%, 21.3% and 27.6%. There was a significant correlation between eating behaviours under stress and BMI groups ($\chi^2:24.768$, $p < 0.05$). Thirty six point five percent of individuals stated that they do not eat at all, 27.8% eat less than normal and 12.5% eat more than normal when they are angry. Eating behaviours during sadness, happiness, stress and anger vary across genders ($p < 0.05$). However, only in women a significant correlation was found between eating behaviours under stress and BMI groups ($p < 0.05$). In sum, it was concluded that eating behaviours in different emotional states affect BMI.

PO1.153

Acceptance and satisfaction of parents and students about a school-based dietary intervention in Isfahan, 2012–2013

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Background and Aim: Snacks play an important role in child health and nutritional status. Schools are considered as the preferred place to encourage healthy eating among children. The aim of this study was to evaluate the effect of buffet school-based intervention on acceptance and satisfaction of parents and students in Iran.

Material/Methods: Primary school students ($n = 1120$, 68.83% girls) from first to third grade, with one of their parents participated in this prospective field trial study conducted in Isfahan, Iran. The study was consisted of three phases; schools selection, kitchen selection, implementation including two different parts, getting order and distribution. We provided hot snacks as traditional and healthy fast food according to taste and food preferences of children. Acceptance and satisfaction of parents and students were evaluated via a researcher made questionnaire before and after the intervention in one-third of participants as a representative sample of students who ordered the snacks.

Results: Most of the students usually ate snack in the break-time at school, the eagerness of provided snacks was 98.8% and 63.6% in girls and boys, respectively. The most interesting tastes were Ashe Reshteh and Tahchin, (45.1% girls Vs. 36.8% boys), while bean (among girls) and Ashe Jo (among boys) were ranked as the lowest. More than half of parents (66.7%) evaluated the price of snacks as "acceptable", showing their satisfaction.

Conclusion: Results of the present study indicate that school-based interventions accompanied with parental and principals' support is considered as a practical approach to promote healthful eating at an early age. Developing effective interventions for youth might therefore help to prevent unhealthy dietary choices becoming habitual.

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PO1.154

'Relation of Food Intake and Body Mass Index in Young Students'

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There are serious problems with regard to food consumption and habits of the young in all of the world. The aim of this research was to investigate the evaluation of food consumption frequency of university students. This study was conducted to determine food consumption frequency of the students studying at different faculties of Gazi University. 250 (68 male, 182 female) volunteer students from the fields of health sciences (n = 140), social sciences (n = 46) and science (n = 64) participated in the research. The average of age of the participants was 19.74 ± 1.84 . The average of body mass index values used for the determination of fatness was 22.55 ± 2.75 and 21.25 ± 2.99 kg/m² for male and female students respectively (p < 0.05). According to the results of the research, female students consume more fruit and vegetable than male students while male students consume more meat, egg and alcohol than female students (p < 0.05). Only 1.6% of female students prefer eating at fast food restaurants once a day while this rate is 11.8 for male students (p < 0.05). It was found out that the amount of salami, sausage etc. and alcohol consumed by health sciences students is less than the amount consumed by social sciences and science students (p < 0.05). The research showed that 6.5% of overweight students, 3.2% of underweight students and 2.7% of healthy weight students consume dessert and cake twice a day. It was also found out that number of overweight students consuming fast food every day is higher than the number of underweight and healthy weight students. These findings indicate that students studying at different faculties have different eating habits.

PO1.155

Nutritional Status and Obesity in Children with Autism Spectrum Disorder

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Autism is a developmental disorder defined by patterns of impaired communication, social interaction and behaviors/interests. Autism refers to Autism Spectrum Disorder (ASD) and Center for Disease Control and Prevention (CDC) indicated a prevalence rate of ASD about 1% of children in USA and its prevalence rates being significantly higher among boys than girls. It is thought that genetic, infectious, metabolic, nutritional and environmental factors are associated with elevated prevalence of autism. Lately, nutritional factors especially maternal and infant nutrition, vitamin and mineral deficiencies and some specific foods / nutrients effects on autism have been discussed. Studies have been shown that increase of obesity prevalence among normally developing children and children with disabilities has become a significant public health problem. The most common problems in children with ASD are eating behaviour disorders and gastrointestinal system problems. Especially the food selection is an important eating disorder in children with ASD. Parents of children with ASD frequently report that their children have inadequate nutrient intake because of having selective eating behavior. It has been suggested that eating disorders, physical activity problems and the over consumption

of junk food are associated with increased obesity in children with ASD. In studies about autistic children's eating habits and anthropometric measurements reported that obesity in children with ASD are higher than normally developing children of the same age. Also, studies have been stated that some vitamin and minerals such as serum folate, vitamin B12, calcium and iron levels are lower in children with ASD. Therefore, eating habits should be evaluated to prevent obesity in children with autism, also dietary treatment strategies related the disease should be developed.

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PO1.156

A cost comparison between the commercially produced formula-based very low calorie diet (FB-VLCD) LighterLife Fast and its nutritionally equivalent conventional food (CF) counterpart

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The average daily nutrient provision of a formula based very low calorie diet (FB-VLCD (LighterLife Fast 600 kcal/day) was previously compared with the equivalent nutrient provided by a similarly energy restricted diet derived of conventional food (CF) commonly consumed in the UK1. We established that meeting but not exceeding the EU dietary reference values (DRVs) for essential nutrients is more easily achieved using a FB-VLCD compared with a theoretical VLC CF daily diet. As there is the belief that FB-VCLDs are both costly and unpalatable, we compared the costs and consumer preference of these two daily diets. A price comparison using data from the UK supermarket comparison website www.mysupermarket.co.uk was undertaken and a brief questionnaire containing images of the two daily meal plans was given to 200 individuals in order to assess visual appeal, ease of preparation and palatability of the two diets. The cost per specific weight of each CF item was then calculated using data from the cheapest prices online at that time (w/c January 11th). Results: show that the cost of the CF diet was £7.59 per day versus £7.99 for one day of LighterLife Fast. The overall preference in terms of ease of preparation, visual appeal and palatability was greater for the FB-VLCD than it was for that of the theoretical VLC-CF diet. FB-VCLDs prevent the need for either nutritional supplements or complex menu planning, often required to prevent the essential micronutrient deficiencies commonly seen with other low calorie CF choices. Whilst these data indicate that there is no significant difference in cost between the two, there is an overall preference for the FB-VLCD based on visual appeal and ease of preparation.

Evaluation of Nutritional Habits in Adolescents Girls

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Background & Aims: Nutritional habits play an important role in adequate and balanced nutrition in individuals. Poor diet quality may be a risk for some chronic diseases especially obesity that occur later in life in adolescents. Obesity prevalence is increasing among adolescents, particularly in girls. Therefore the current study was planned to determine daily consumption of food groups in underweight, normal weight and overweight adolescent girls.

Material/Methods: This study was conducted with 710 adolescent girls aged between 15–19 years. Three consecutive days (two weekdays and one weekend day) food records were compiled by dietitians. Dietary Guidelines for Turkey used for recommended amounts of food groups.

Results: Legumes, cheese, breads/cereals and fruit and vegetables consumption of overweight adolescents were significantly higher than underweight participants ($p = 0.000$). Sugar consumption of underweight participants were significantly higher than normal and overweight participants ($p < 0.05$). In addition there was no significant differences in daily fat, milk-yoghurt consumption between underweight, normal weight and overweight participants ($p > 0.05$). The consumption of all food groups except meats were lower than recommended amounts in all participants. Only meat consumption of overweight participants were higher than underweight and normal weight participants.

Conclusion: Consumption of legumes, dairy foods, breads/cereals, meats, fruits and vegetables have a positive impact on children and adolescents' diet quality, whereas higher consumption of sugars and fats have a negative impact on their diet quality. Therefore eating habits should be evaluated to prevent obesity in adolescent individuals also adequate and balanced nutrition should be ensured.

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Table 1. to PO1.157 Mean amount of pyramid food group according to weight ($n = 710$)

* $p < 0.05$ ** $p = 0.000$

Food (g/d)	Recommended (g/d)	Underweight ($n = 180$) $\bar{x} \pm SD$	Normal weight ($n = 460$) $\bar{x} \pm SD$	Overweight ($n = 70$) $\bar{x} \pm SD$	p
Meats	110	109.2 \pm 51.4	96.4 \pm 79.4	135.0 \pm 59.7	0.011*
Legumes	30	11.6 \pm 9.8	24.4 \pm 32.1	8.9 \pm 7.2	0.000**
Milk-yoghurt	300	104.3 \pm 70.9	129.5 \pm 83.4	134.5 \pm 114.9	0.442
Cheese	30	29.4 \pm 22.9	11.3 \pm 9.9	12.9 \pm 14.2	0.000**
Breads/cereals	380	137.9 \pm 137.5	209.3 \pm 142.3	281.3 \pm 135.8	0.000**
Fruit and vegetables	700	322.4 \pm 115.9	479.9 \pm 211.9	480.8 \pm 234.2	0.000**
Fat	Minimal	35.5 \pm 18.0	38.5 \pm 22.5	43.1 \pm 33.3	0.331
Sugar	Minimal	24.2 \pm 20.6	18.3 \pm 19.3	13.5 \pm 19.1	0.027*

White rice consumption could increase the risk of abdominal obesity: A 3- year follow-up in Tehran Lipid and Glucose Study

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Background: White rice as an Asian staple food may accelerate the development of adiposity and related metabolic disorders. In this study we investigated the association of white rice consumption and the risk of abdominal obesity in adult men and women.

Methods: This longitudinal study was conducted within the framework of the Tehran Lipid and Glucose Study on 1476 adults, aged 19–70 years. Dietary intakes were measured, using a 168-food items validated semi-quantitative food frequency questionnaire at baseline. Anthropometric measurements were evaluated at baseline (2006–2008) and again after 3-year follow-up (2009–2011). Multiple logistic regression models were used to estimate the occurrence of the abdominal obesity in each quartile of white rice consumption in the participant.

Results: The mean age of participants was 37.8 ± 12.3 y, and mean BMI was 26.0 ± 4.5 kg/m² at baseline. Mean daily intake of white rice was 249 ± 173 g/d (293 ± 188 and 220 ± 156 g/d, in men and women, respectively). Mean daily energy intake of white rice from total energy intake also was $14.3 \pm 8.56\%$ (16.1 ± 8.8 and 13.1 ± 8.2 , in men and women, respectively). Three-year weight gain was higher in the highest compared to the lowest quartile of white rice consumption (3.3 vs. 2.8%, $P < 0.05$). There was an increasing trend in 3-year change of waist circumference across increasing consumption of white rice (5.9, 6.2, 7.0 and 7.2% in the first, second, third and fourth quartiles, respectively, P for trend = 0.03). Highest compared to the lowest quartile of white rice consumption was accompanied with an elevated risk of abdominal obesity (OR = 1.85, 95% CI = 1.06–3.31)

Conclusion: Higher consumption of white rice may be a dietary risk factor for development of abdominal obesity.

The Effect of a Hypocaloric Diet on Micronutrient Intake in Overweight and Obese Patients

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Background and Aims: According to World Obesity Federation, in 2025 there will be 2,7 billion adults suffering from overweight and obesity, up from 2 billion in 2014. We need to improve weight management in order to obtain a healthy weight.

Material and methods: A sample of 126 overweight and obese patients was placed on a hypocaloric diet and physical activities. Using a 7-day food self record questionnaire, we evaluated the nutritional content of food intake: total kilocalories, carbohydrates, proteins, lipids, cholesterol, vitamins A, B1, B2, B3, B5, B6, B12, C, D, E, folic acid, and minerals like calcium, iron, magnesium, phosphorus, zinc, copper, manganese, selenium, and sodium.

Results: The mean weight loss was of 10 kilos, from 94.41 kg to 84.08 kg ($p < 0.001$) and the mass of body fat improved from 40.07 kg to 31.55 kg ($p < 0.001$). Lower abdominal circumference was obtained after the nutritional intervention, from 110.81 cm to 103.18 cm ($p < 0.001$). All the patients had a decreased caloric intake and a normal fat, hypoglucidic diet after the nutritional intervention. We found that sodium intake decreased but remained above 2000 mg/day ($p < 0.001$) and the proteins increased ($p < 0.05$). The mean intake of vitamin B1 ($p = 0.016$) and B9 ($p = 0.05$) also decreased and vitamin C is the only micronutrient that had higher levels in the end ($p = 0.017$). Regarding the 8 studied minerals, 4 of it decreased significantly: calcium ($p = 0.02$), magnesium ($p = 0.027$), iron ($p = 0.02$) and copper ($p = 0.027$). There was an excessive intake of more than 200% of recommended daily intake (RDI) for vitamins A, C and B12 and above 150% of RDI for phosphorus and selenium. Vitamin D, E and B9 are below RDI with an intake of 20.14%, 63.03% and 79.54% of RDI. Calcium and magnesium are the only minerals deficient with 68.81% and 71.86% of RDI.

Conclusions: Nutritional intervention improved total weight, body fat and abdominal circumference. There is an imbalance diet regarding macronutrient, vitamins and minerals in overweight and obese patients. We need to pay more attention to food composition in order to prevent micronutrient deficiencies.

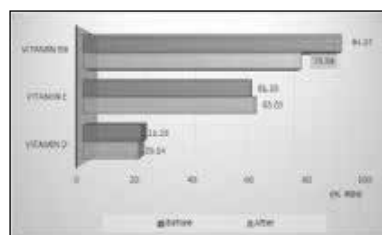


Fig. 1. Deficient vitamins after the nutritional intervention

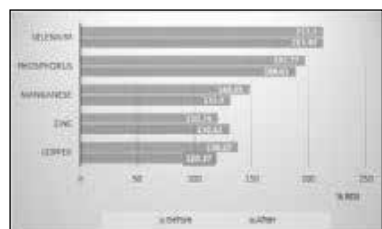


Fig. 2. Excessive minerals after the nutritional intervention

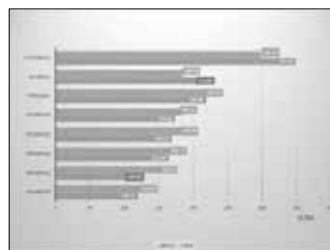


Fig. 3. Excessive vitamins after the nutritional intervention

PO1.160

Assesment of Anthropometric Measurements in Adolescent

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Background/Aim: The rise in the prevalence of obesity is one of the most alarming public health issues facing the world today. Lifestyle, food habits and physical activity established during childhood and adolescence many contribute to some chronic disease, including obesity, in adulthood. Growth assessment is important to evaluating the health and nutritional status of adolescence. This study was planned to determine weight, body mass index (BMI), waist/hip ratio, fat free mass, fat mass, midupper arm circumference, skinfold thickness at a group of adolescence.

Material/Methods: This study was conducted with 710 adolescent girls aged between 15–19 years. For evaluation of children's growth, anthropometric measurements (height, BMI, mid upper arm circumference, mid upper arm muscle circumference, skinfold thickness, waist/hip ratio) were taken in an appropriate manner and body composition (percentage of body fat and fat free mass) were assessed by TBF 418 bio electrical impedance analysis. **RESULT:** The mean weight of underweight, normal weight and overweight adolescent were 50.6 ± 6.0 kg, 65.0 ± 7.8 and 80.7 ± 13.0 kg, respectively ($p < 0.05$). According to classification of BMI, 25.4% of adolescents were underweight, 64.8% of them were normal weight and 9.8% were overweight. All the other antropometric measurement of underweight adolescent were found significantly lower than normal weight and overweight ($p < 0.05$). Overweight adolescent's body fat percentage were higher than normal weight and underweight adolescent ($p < 0.05$), (Table 1).

Conclusions: Replacing nutritional habit in young population by effective and continuous nutritional education is important for body weight control and non-communicable disease in latter ages.

Table 1. Anthropometric measurements according to weight (n = 710)

* $p < 0.05$ BMI = Body Mass Index, MUAC = Mid Upper Arm Circumference, MUAMC = Mid Upper Arm Muscle Circumference, SFT = Skinfold Thickness, WHR = Waist/Hip Ratio, FM = Fat Mass, FFM = Fat Free Mass

Anthropometric measurements	Under-weight (n = 180) $\bar{x} \pm SD$	Normal weight (n = 460) $\bar{x} \pm SD$	Overweight (n = 70) $\bar{x} \pm SD$	p
Weight (kg)	50.6 ± 6.0	65.0 ± 7.8	80.7 ± 13.0	0.000*
BMI (kg/m ²)	18.7 ± 1.2	22.3 ± 1.4	27.1 ± 2.4	0.000*
MUAC (cm)	22.8 ± 1.8	26.6 ± 2.4	30.9 ± 2.3	0.000*
MUAMC (cm)	19.7 ± 2.5	22.2 ± 3.1	25.4 ± 2.8	0.001*
Triceps SFT (mm)	9.9 ± 4.2	13.9 ± 6.6	17.4 ± 6.5	0.024*
Sum SFT (mm)	37.8 ± 13.2	55.0 ± 22.2	84.2 ± 22.1	0.000*
WHR	0.74 ± 0.05	0.78 ± 0.04	0.83 ± 0.04	0.000*
FM (%)	22.8 ± 4.8	26.0 ± 7.2	31.6 ± 4.3	0.022*
FFM (%)	77.2 ± 4.8	74.0 ± 7.2	68.4 ± 4.3	0.022*

PO1.161

dinner timetable is associated with bmi values in a sample of chilean adults

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Background: Overweight and obesity prevalence has alarmingly increase worldwide. In the particular case of Chile, it is one of the countries with the highest rates of Latin America region. Therefore, new aspects are being investigated as related to the onset and development of obesity in order to design effective tools to prevent and counteract this disease. In this context, meal timing has been very recently proposed to affect body weight, blood pressure or glucose tolerance, among other aspects.

Objective: To evaluate the potential association between meal timing, specifically dinner, and the presence of overweight in a sample of Chilean adults.

Material/Methods: Data were obtained from National Health Survey, carried out by the Chilean Ministry of Health between years 2009–2010, which was an observational and transversal study. 5416 adult subjects were recruited, being the sample representative of both rural and urban areas and male and female gender. Waist circumference, body weight and height were determined following validated protocols and body mass index (BMI) was calculated as the body weight divided by the squared height (kg/m^2). The sample was categorized according to dinner time into two groups: before 8 pm or after 8 pm.

Results: Data for this report include 5265 subjects (2141 men, 3124 women; mean age 46 ± 19 years old). When comparing the two groups categorized by dinner time it was observed that those having dinner after 8 pm showed significantly higher BMI values than those having this meal before 8 pm ($28.01 \pm 5.40 \text{ kg}/\text{m}^2$ vs. $27.59 \pm 5.35 \text{ kg}/\text{m}^2$; $p = 0.009$). The same trend was observed for waist circumference ($102.19 \pm 100.97 \text{ cm}$. in the before-8-pm-group vs. $97.37 \pm 69.70 \text{ cm}$. in the after-8-pm-group; $p = 0.071$).

Conclusion: Eating late is associated with higher BMI values within Chilean adults. The meal timing should be taken into account when designing dietary approaches for body weight management.

PO1.162

Correlation between eating patterns and weight status

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Background & Aims: Food intake and eating habits are closely related with body weight status and depend on the social and demographical characteristics. Eating pattern may influence weight status in a geographic area. Promoting specific healthy eating habits may prevent weight gain, reduce cardiovascular risk and facilitate management of obesity and overweight.

Objectives: Our study assessed eating patterns and their relation to body weight in a specific geographic area.

Material & Methods: Study group: 311 adult persons – representative group for age,gender, residence(urban,rural) of Galati County(Romania) population. Parameters: age,gender,residence,season,income,eating habits,eating preferences,fat intake,weekly food groups intake – self-reported on Obesity Screening Form of Romanian Association for the Study of Obesity; weight, body mass index(BMI), weight categories(under-weight,normal weight,overweight,obesity). Statistics – by SPSS program.

Results: Eating pattern – number of meals were correlated with gender; number of snacks and breakfast were correlated with gender,age,season. Eating preferences – men prefer more bread,meat,cold cuts, while women prefer more fruits.With increasing age,subjects consumed more vegetables and less meat,cakes,juices.Persons prefer cheese more in urban area than in rural area. Fat intake – men consume more lard,bacon;persons with age 30–39 and > 60 consume more whipped cream;subjects consume

more butter,cream in urban area;participants use more lard during summer and butter,bacon,whipped cream during winter. Weekly food intake -different groups were associated with gender,age,residence,season. BMI – was related to cheese intake,butter,margarine and sweets. We presented only statistically significant results ($p < 0.05$).

Conclusion: Eating pattern may influence weight status by specific food intake in a geographic area. Knowing these factors, we may actively intervene in preventing and managing weight gain by specifically motivating and increasing adherence in targeted individuals.

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PO1.163

Determination of nutritional status in adult celiac patients and impact of gluten-free diet on health related quality of life

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Objective: This study conducted to determine the nutritional status in adult patients with celiac disease and to asses the effect of gluten-free diet on health related quality of life.

Method: A total 103 individuals (26 males,77 females) who diagnosed with celiac disease by a physician, registered in Ankara Celiac Society, aged between 24–50 were enrolled the study. Research data were collected by the researchers with using “survey method”. Celiac Disease Health-Related Quality Of Life Questionnaire (CDQ) was used to evaluate the quality of life. Nutrient intake of the patients were determined using 24-hour dietary recall method. SPSS version 20.0 was used for statistical analysis.

Results: The mean age of the patients was 37.5 ± 8.89 years and the diagnoses age was 31.0 ± 11.85 years. Male's average body mass index (BMI) values were significantly higher than females ($p = 0.015$). In female, the incidence of bone and joint diseases and chronic anemia were higher than male ($p = 0.007$ and $p < 0.001$, respectively).When daily energy, macro and micro nutrients intake analyzed; energy, total protein, total fat, polyunsaturated fatty acids (PUFAs), vitamin B2, sodium, phosphorus, iron and zinc levels were found to vary significantly according to gender ($p < 0.05$). When the quality of life of individuals in total and subscale scores were examined; all score values of male were found to be more than the female ($p < 0.05$).Life scores in the concern sub-branch were higher in female and male subjects those who practice a gluten-free diet compared with those who implement occasional diet ($p < 0.05$). A positive correlation was found between the total quality of life scores and the time to make gluten-free diet and BMI; while a negative correlation was found between age at diagnosis, time of complaints before diagnosis, the number of comorbid diseases and quality of life scores ($p < 0.05$).

Conclusions: Celiac is a disease that requires lifelong treatment. Thus, gluten-free nutritional products of the patient should be developed for flavor and nutrients. Awareness for celiac disease in society should be created.

Metabolic Syndrome and Probiotics – Prebiotics

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Metabolic syndrome (MetS) is defined by a constellation of interconnected physiological, biochemical, clinical, and metabolic factors that directly increases the risk of cardiovascular disease, type 2 diabetes mellitus, and all cause mortality. (1). Lately, there has been a increasing interest in the use of food supplements including probiotics and prebiotics for their suggestive role in the control and the management of MetS (2). Probiotic strains, especially those of the *Lactobacillus* and *Bifidobacterium* genera, provide various beneficial effects in subjects with MetS. They seem to promote weight loss and the reduction of visceral adiposity, to improve glucose tolerance, and to modulate intestinal low grade inflammation (3). In a study *Lactobacillus gasseri* was given to the subjects with abdominal adiposity for 12 weeks. At the end of study body fat mass, the visceral fat area, body mass index (BMI), and waist and hip circumferences of the individual were decreased (-2.4%, -8.5%, -1.1%, -1.4%, -1.2%, respectively) (4). Another study has demonstrated that for 90 days' use of *Lactobacillus plantarum* in women with MetS caused to decrease in serum glucose and homocysteine levels (5). Therefore it has been mentioned that specific probiotic strains and prebiotics may be used in the prevention and treatment of MetS (6). However, further studies are needed to better understanding their clinical impact and therapeutic use.

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Quinoa, Food Intake and Satiety

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Quinoa (*Chenopodium quinoa*) is a pseudo-cereal which was consumed by Indians for thousands of years. However, there is a growing interest in quinoa because of its nutritional compositions and weight&health concerns of people nowadays. In general, it has been reported that it has higher nutritive value than traditional cereals. Quinoa has high variations in nutrient contents: protein (9.1–15.7g/100g), total fat (4.0–7.6g/100g) and dietary fibre (8.8–14.1g/100g). It is also an important source of some minerals, vitamins and bioactive compounds. There are conflicting results in studies about effects of quinoa on food intake&satiety. In a study, it was found that no significant difference in food intake&satiety were observed between quinoa and rice, total energy intakes were also comparable. Although it was reported that quinoa had't effects on food intake&satiety, some researchers found that it could cause some metabolic improvements. In a study, it was conducted on 35 women with weight excess who consumed 25 grams of quinoa-flakes daily during a period of four consecutive weeks. As a result of this study, there was a reduction of total cholesterol and LDL-C and the increase in GSH occurred without significant reduction of total calories. In another study, it was demonstrated that quinoa diet was effective in improving blood glucose response and maintaining plasma free-fatty acids and general lipid profiles subsequently after the meal compared to control group in rats. Controversy, quinoa may have antiobesity effects via increasing satiety and decreasing food intake. In a study, it was observed that the rats ingesting quinoa-supplemented diets exhibited lesser food intake as compared to control because of bring down plasma ghrelin levels while meliorating plasma leptin and cholecystokinin levels postprandially. In another studies, it was demonstrated that chronic consumption of a quinoa extract alleviated the effect of high-fat feeding on adipose tissue gain in mice. In summary, it can be used as a part of

diet because of nutritive values and potential metabolic effects in spite of conflicting results in studies about effects of quinoa on food intake&satiety. References Berti, et al. Effect on appetite control of minor cereal and pseudocereal products. British Journal of Nutrition 2005;94:850–858. Nowak V, et al. Assessment of the nutritional composition of quinoa. Food Chemistry 2016;47–54.

Resting metabolic rate: In the planning of medical nutritional therapy of the obesity

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An imbalance of energy intake and energy expenditure leads to obesity which is associated with increased morbidity and mortality. In contrast, persistent weight loss significantly reduces the increased overall mortality. Physical activity improves weight loss and is also a good predictor of long-term weight loss maintenance. Total energy expenditure (TEE) consists of resting energy expenditure (REE), the thermic effect of food (TEF) and activity thermogenesis (AT) (1). Measurement of resting metabolic rate (RMR) is a necessary component in the evaluation of the medical nutritional therapy in obesity. The metabolic rate could be measured by indirect calorimetric methods or estimated by equations. RMR measurements involve the estimation of the oxygen consumption of the individual, which was then converted into units of heat or energy output. In general most investigators involved in RMR measurements use a range of techniques available to estimate oxygen consumption, which provide more or less the same results (2). Four prediction equations were identified as the most commonly used in clinical practice [Harris-Benedict, Mifflin-St Jeor, Owen, and World Health Organization/Food and Agriculture Organization/United Nations University (WHO/FAO/UNU)]. However, predictive equations might generate errors large enough to impact outcome. The Mifflin-St Jeor equation is more likely than the other equations tested to estimate RMR, but noteworthy errors and limitations exist when it has been applied to individuals and possibly when it has been generalized to certain age and ethnic groups. RMR estimation errors would be eliminated by valid measurement of RMR with indirect calorimetry (ergospirometry, etc.) in obese patients to minimize measurement error and proper planning of medical nutritional therapy (3). References 1. Clin Nutr 2010; 29(6): 766–772. 2. Türkiye Klinikleri J Cardiovasc Sci 2011;23(1):54–60 3. Journal of the American Dietetic Association 2005; 105 (5): 775–89.

Does fructose cause obesity?

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Intake of added sugar, predominantly high fructose corn syrup (HCFS) and sucrose, has increased markedly since 1970s and compose major source of fructose. Fructose has been claimed to be of benefit because it may aid glycemic control, but it has been claimed to be more harmful than other sugars, especially with regard to the development of atherosclerosis, type 2 diabetes and obesity. Fructose cannot stimulate leptin secretion sufficiently and cannot suppress ghrelin secretion which in turn increases appetite and decreases satiety [1]. Therefore, excessive fructose intake can lead to excessive energy intake and hence weight gain. It was reported that fructose intake lead to increase in visceral adipose tissue [2]. In a study the effect of daily dietary intake of fructose exceeding 50 g showed no statistically significant contribution to the risk of higher BMI [3]. There are several studies indicate that no difference in the effects on appetite between fructose and glucose [4,5]. Besides fructose has several properties that act against obesity. Because of small intestine has a limited capacity to absorb fructose if large amounts of fructose are consumed can lead

malabsorption. Malabsorption of fructose will make less fructose enter the bloodstream. In addition to fructose has a greater thermogenic effect than glucose [6,7]. The high relative sweetness allows smaller amounts of fructose than glucose and sucrose. However, studies on the effect of high fructose intake on body weight are mostly carried out on rats, case-control studies are insufficient. Normal consumption of fructose from natural sources may not increase obesity, however a high intake of fructose may have negative health effects. WHO recommends to consume added sugar max 10% even max 5% of the energy intake.

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PO1.168

The Effects Of Helicobacter Pylori Infection On Nutrition Status And Metabolism

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H. pylori which is common in the World has been identified as a group 1 carcinogen by the World Health Organisation (WHO) is a Gram negative pathogen. Low socio-economic level, low consumption of fruits and fresh vegetables, increased consumption of fast food, tobacco use and poor oral hygiene are reported risk factors for *H. pylori* infection. *H. pylori* colonize in the epithelial cell lining of the stomach by affecting the human gastric flora that disrupts the gastric mucosal entirety. The presence of bacteria affect the levels of ghrelin and leptin hormones results in negative effects on appetite and food intake. Also, some micronutrient malabsorptions, especially folate, homocysteine and iron deficiency can develop because of gastric mucosal atrophy and reduction of gastric acid secretion in the presence of *H. pylori* infection. In the presence of *H. pylori* the leptin levels are increased while the ghrelin levels and ghrelin/obestatin ratio are decreased. After the eradication of *H. pylori*, ghrelin levels and appetite increases that results in body weight gain. Some studies have showed that *H. pylori* infection is effective in the development or progression of gastrointestinal diseases, metabolic syndrome, insulin resistance, diabetes and diabetes complications. By causing the activation of proinflammatory and vasoactive components, production of reactive oxygen species or changes in ghrelin and leptin levels are several mechanisms that is supposed to explain the relation between *H. pylori* and metabolic syndrome and insulin resistance. Recent studies are focused on the possible protective and/or preventive effects of some foodstuffs and nutrients. It has been mentioned that especially fresh fruits, vegetables and some probiotic formulations can play an important role in the treatment of *H. pylori* infection.

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PO1.169

The Mechanism and Effect of Ketogenic Diet in Obesity

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The prevalence of obesity increases worldwide. Obesity has been a significant risk factor for hypertension, type 2 diabetes, dyslipidemia, atherosclerosis and some kind of cancers. The diet treatment in obesity has a

fat lowering approach. However, recent studies have focused on ketogenic diet and its effects. Ketogenic diet is an alternative treatment in uncontrolled seizures. It is also thought that ketogenic diet is effective in some metabolic diseases, cancers, diabetes, polycystic ovarian syndrome, cardiovascular and neurological diseases. Ketogenic diet includes high fat, low carbohydrate (usually lower than 50 g/day) and essential amount of protein. Proteins in ketogenic diet provide satiety and have effect on appetite controlling hormones. In addition, the decrease in lipogenesis and the increase in lipolysis, high thermogenic effect of proteins and glyconeogenesis provide weight loss. Background studies emphasize during 3 to 6 months low carbohydrate diets are more effective than low fat and energy restricted diets on weight loss. But comprehensive and long studies are needed. Weight loss in ketogenic diet is mostly related with loss in fat mass in the body. Low carbohydrate diets are also related with better glycaemic control, improvement in hemoglobin A1c levels and lipid profiles. It is reported that low carbohydrate diets may be effective in body weight related chronic diseases and are not harmful in short term. However in long term therapies, ketogenic diet may cause especially low in diet fiber and also thiamine, folate, potassium, calcium, magnesium, iron, vitamin A, vitamin E and vitamin B6 deficiency. It is known that ketogenic diet has positive effect on weight loss in short applications but longlasting applications are needed.

PO1.170

Waist to Height Ratio: Is it related with Obesity and Anthropometric Measurements in Turkish Individuals?

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This research was conducted to examine the relationship between waist-height ratio and obesity and anthropometric measurements as well. It was conducted on 610 Turkish young adults (19.9 ± 1.63 years, 338 men and 272 women). Some anthropometric measurements of individuals was taken; waist/hip ratio, waist/height ratio and body mass index (BMI) values were calculated. Waist/height ratio cut-off value was determined as 0.5 for women and men by Ashwell et al (2005). According to BMI classification 9.5% of the individuals were underweight, 70.3% normal weight, 17.0% overweight and 3.1% obese. Waist/height ratio of 13.1% of individuals was above 0.5. Of individuals whose waist/height ratio was above 0.5, 65.0% were overweight, 22.5% obese and 12.5% normal weight. Of individuals whose waist/height ratio was under 0.5, 79.1% were normal weight, 10.9% underweight and 9.8% overweight. There was a statistically significant difference between mean BMI values of individuals whose waist/height ratio was above 0.5 and whose waist/height ratio was under 0.5 ($p < 0.05$). A statistically significant correlation was found between waist/height ratio and weight ($r:0.688$), BMI ($r:0.871$), mid-upper arm circumference ($r:0.681$), calf circumference ($r:0.625$), waist circumference ($r:0.936$), hip circumference ($r:0.673$) and waist/hip ratio ($r:0.729$) in men ($p < 0.05$). In women, on the other hand, a correlation was determined between waist/height ratio and weight ($r:0.623$), BMI ($r:0.816$), mid-upper arm circumference ($r:0.678$), arm span ($r:-0.204$), calf circumference ($r:0.457$), waist circumference ($r:0.925$), hip circumference ($r:0.607$) and waist/hip ratio ($r:0.696$) ($p < 0.05$). In conclusion, it was found that waist/height ratio is related to obesity and some anthropometric measurements and this relationship varies across genders.

PO1.171

"Relationship Of Food Intake And Body Mass Index In Young Students"

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Background and Aim: There are serious problems with regard to food consumption and habits of the young in all of the world. The aim of this research was to investigate the evaluation of food consumption frequency of university students

Method: This study was conducted to determine food consumption frequency of the students studying at different faculties of Gazi University. 250 (68 male, 182 female) volunteer students from the fields of health sciences (n = 140), social sciences (n = 46) and science (n = 64) participated in the research. The average of age of the participants was 19.74 ± 1.84 . The average of body – mass index values used for the determination of fatness was 22.55 ± 2.75 and 21.25 ± 2.99 kg/m² for male and female students respectively (p < 0.05).

Results: According to the results of the research, female students consume more fruit and vegetable than male students while male students consume more meat, egg and alcohol than female students (p < 0.05). Only 1.6% of female students prefer eating at fast food restaurants once a day while this rate is 11.8 for male students (p < 0.05). It was found out that the amount of salami, sausage etc. and alcohol consumed by health sciences students is less than the amount consumed by social sciences and science students (p < 0.05). The research showed that 6.5% of overweight students, 3.2% of underweight students and 2.7% of healthy weight students consume dessert and cake twice a day. It was also found out that number of overweight students consuming fast food every day is higher than the number of underweight and healthy weight students.

Conclusions: These findings indicate that students studying at different faculties have different eating habits.

PO1.172

Determination of nutritional status and anemia in Multiple Sclerosis (MS) patients

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Aim: This study was aimed to determine the nutritional status, and some anemia parameters (haemoglobin, vitamin B12, homocysteine) of the Multiple Sclerosis (MS) patients.

Methods: It was conducted on 63 MS patients (41 female, 22 male) who have applied to Ankara Numune Education and Research Hospital, Department of Neurology, Turkey. Some anthropometric and biochemical measurements were taken from the study group. Nutritional status was assessed by food frequency consumption results.

Results: The Relapsing/Remitting Multiple Sclerosis (RRMS) was mostly seen in both genders (90.5%). The mean age was found 34.9 ± 8.59 (20–56) years in the study group. The mean body mass index (BMI) was found as 25.2 ± 4.86 kg/m². While the mean haemoglobin (p < 0.001) and homocysteine (p = 0.007) levels were found significantly high; the vitamin B12 level (p = 0.025) was low in males. The consumption of cheese, red meat, white bread, sugar and carbonated drinks were decreased after the diagnosis period in females (p > 0.05). There was found no change in the consumption of egg, chicken, legumes, vegetable, fruit, margarine, butter and olive oil. Most of the two groups have consumed fish rarely before and after the diagnosis of MS.

Conclusion: It was concluded that nutritional status of MS patients improved after diagnosis and serum proteins which are also an indicator of adequate and balanced nutrition were in desired levels.

PO1.173

Lipid profiles and obesity in multiple sclerosis (MS)

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Multiple sclerosis (MS) is an inflammatory demyelinating disease of the central nervous system that causes neurological impairment which mainly affects adults (1). Obesity is associated with a low-grade chronic inflammatory state and release of cytokines that affect immune responses and possibly MS risk. The relationship between obesity during adolescence and MS risk has previously been investigated using two large cohorts of American women in which obese female adolescents displayed an increased risk of developing MS. The normal body mass index (BMI) range, as defined by the World Health Organization (WHO), is quite wide, and some people within this range may have excessive central fat accumulation and elevated metabolic risks. The waist-to-height ratio (WHtR), an effective index for assessing central fat distribution, can be used to identify subjects who are at higher metabolic risk within the normal as well as the overweight range. An adequate and balanced diet with a regular physical activity of MS patients is important for providing a healthy life and improving quality of life (QoL) (2,3). Further research is needed to understand the associations between obesity and MS.

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PO1.174

Obesity and Hypertension

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Obesity is a major independent risk factor for hypertension (1). There is, however, controversy regarding which anthropometric indicator best defines obesity and conveys the highest risk of hypertension (2). Central obesity is a stronger correlation factor than body mass index (BMI) for high blood pressure. Hypertension is also associated with a cluster of risk factors characteristic of the metabolic syndrome, of which overweight/central obesity could be the cornerstone. Management of arterial hypertension should focus both on lowering high blood pressure (BP) and correcting associated lipid disorders (3). It is suggested that earlier prevention of excessive weight gain is needed to reduce hypertension in these population-beneficial effects of lifestyle modification, and this and the 'Dietary Approaches to Stop Hypertension' (DASH) diet should be top priorities for health and government officials. Epidemiological studies are needed to indicate the relation between central obesity and hypertension incidence (4).

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PO1.175

Trends and Prevalence of Childhood Overweight and Obesity in the Republic of Ireland

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Background & Aims: The prevalence of overweight and obesity appears to have reached a plateau across many developed countries, including Ireland. The aim of this review was to examine the 12-year trend of the prevalence of overweight and obesity among primary school aged children in Ireland between 2002 and 2014.

Objective: To compare the prevalence of overweight and obesity among Irish children aged between 4 and 13 years using data collected from the Republic of Ireland in 2002 and 2014.

Material/Methods: BMI data from two representative cross-sectional samples of school-going children (aged 4–13 years) was analysed from 2002 (n = 14,036) and 2014 (n = 5,232). Data on height and weight were objectively measured by trained research assistants in 2002 from a random sample (based on age, gender and geographical location of school) using standardised and calibrated measures. These methods were replicated for data collection conducted in 2014. Standard International Obesity Task Force criteria was applied to determine the prevalence of overweight and obesity.

Results: Between 2002 and 2014, preliminary analysis shows that the prevalence of overweight and obesity has decreased from 23% to 20% among boys and from 29% to 27% among girls aged 4–13 years in the Republic of Ireland. Among children aged 4–7 years, the prevalence of overweight and obesity has decreased from 22% to 18% among boys and 29% to 25% among girls, while among children aged 11–13 years, the prevalence has decreased from 25% to 23% for boys but has increased from 27% to 28% among girls.

Conclusion: The prevalence of overweight and obesity has been levelling off and there is evidence of a slight fall. While these findings are encouraging, the prevalence remains high among children aged 4–13 years in the Republic of Ireland. Therefore, the issue of childhood overweight and obesity must remain a key public health policy issue.

Acknowledgement: Oral Health Services Research Centre, University College Cork, Ireland.

PO1.176

Hospital costs in relation to body mass index in 1.1 million women in England: A prospective cohort study

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Background: Elevated body mass index (BMI) is associated with poor health outcomes and higher healthcare costs. However, a detailed understanding of the effects of BMI on healthcare use and costs, overall and for different health conditions, is lacking.

Methods: Among 1.1 million participants in the Million Women Study (50 to 64 years at recruitment with 12 years average follow-up), annual hospital costs, annual rates of hospital admission and mean costs of admission were estimated in relation to BMI at recruitment, adjusting for potential confounders. Relationships were also estimated separately for 16 categories of health conditions, defined by ICD-10 chapters. The effects of elevated BMI on hospital costs were projected to the 2013 population of women aged 55 to 79 in England.

Results: Annual hospital costs were lowest for BMI 20 to 22.5 kg/m² (£559 per woman per year; 99% CI: 548–570) and were increasing in BMI thereafter. Each 5 kg/m² increase in BMI above 25 kg/m² was associated with a 21% (20–22) increase in hospital costs, reflecting an increased rate of admission (14%; 13–14) and a higher mean cost of admission (7%; 6–8). Significant relationships between higher BMI and higher annual hospital costs were found for 14 of the 16 categories of health conditions. In England, 14% (£643 million) of total hospital costs among women aged 55 to 79 were attributed to overweight and obesity (BMI ≥25 kg/m²), of which 39% were due to musculoskeletal admissions, predominantly for osteoarthritis.

Conclusions: Excess weight is strongly associated with increases in hospital admissions and costs for many health conditions in women aged 55–79.

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PO1.177

The use of nutrient profiling to guide reformulation towards improved energy and nutrient content

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Background & Aims: Reformulation is considered to be a powerful and cost-effective tool to improve nutrient intakes [1]. To-date there is limited research focusing on the potential impact of applying nutrient profiling systems for reformulation.

Objectives: Estimating the potential of a category-specific nutrient profiling system to improve the energy and nutrient content of the current food supply.

Material & Methods: Foods reported in national dietary surveys (INCA2 for France and NHANES 2011–2012 for the US) were profiled using the Nestlé Nutritional Profiling System (NNPS). Serving sizes were fixed using US reference amounts customarily consumed (RACC). Products meeting all criteria were classified NNPS “Pass”. Descriptive statistics were used to compare Pass vs Fail products within the same category in terms of average total energy content and energy coming from added sugars (AS) and saturated fatty acids (SFA). Analyses included only food categories with at least 5 Pass and 5 Fail products.

Results: A total of 614 (37.5% Pass) and 2651 (32.5% Pass) foods items, representing 11 and 16 NNPS categories were analysed for France and the US, respectively. NNPS Pass products had lower energy content per serving compared to NNPS Fail products in each category, except for juice-based beverages in France (Figure 1, data not shown for US). In both France and the US, highest energy content reductions were observed in cakes & desserts (134 and 124 kcal/serving, respectively). NNPS Pass products also had a more balanced nutrient composition with lower %energy from SFA and/or AS (France, Figure 2; US data not shown).

Conclusion: The use of nutrient profiling systems for product reformulation could be an effective method to improve energy and nutrient composition of products. More research is needed to estimate the global applicability of such a system and its potential impact on populations' diets. Together with behavioural changes and nutritional education, nutrient profiling could contribute to improved public health. References [1] Dobbs, R., et al., Overcoming obesity: An initial economic analysis, 2014, McKinsey Global Institute.

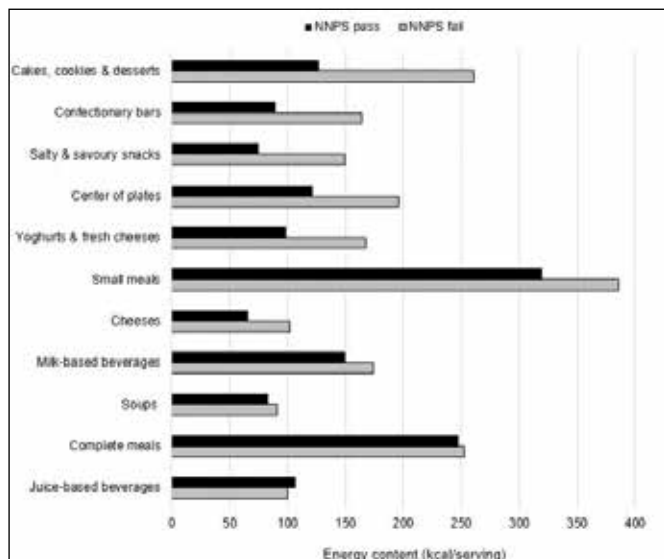


Fig. 1. Average energy content per serving of NNPS Pass and Fail products from 11 NNPS product categories (French INCA2 data). Categories were ordered by absolute reductions in energy content.

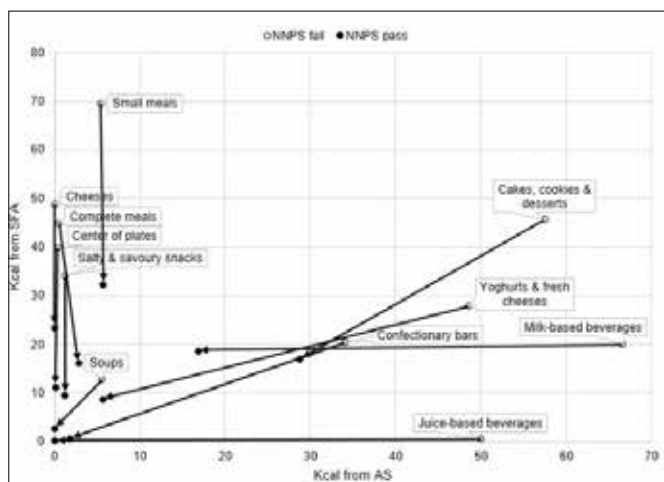


Fig. 2. Average amount of energy coming from added sugars (x-axis) and saturated fatty acids (y-axis), for 11 NNPS product categories (French INCA2 data). The start of the arrow represents the average nutrient composition of NNPS Fail products (○), the arrow points towards the composition of NNPS Pass products (●).

PO1.178

To Snack or Not to Snack? When, what, why

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Objective: In the absence of a global consensus for optimal snacking, a systematic review of existing recommendations worldwide was conducted to determine the characteristics of an optimal snack for the general population.

Methods: The most recent dietary guidelines (September 2015) were identified for snacking recommendations through the FAO and local nutrition societies' websites and a network of experts. Qualitative and quantitative guidelines were analysed to extract information about: a) definitions and frequency of snacking b) recommended snack foods and their composition and c) the recommendations' rationale.

Results: A total of 151 dietary guidelines were identified in 56 countries, of which 134 mentioned snacking (40 unique countries). An explicit definition of snacking was rarely provided ($n = 6$) and when it was, it referred to eating occasions in between main meals or eating occasions of 100–150kcal. The recommended frequency of consumption ranged from 1–4 snacks per day ($n = 60$) with 2 per day being the most common (57%). Recommended energy from snacks ranged between 10–30% daily ($n = 12$) with only one country providing targets for specific nutrients. Snack foods rated as 'healthy' or 'nutritious' included fruit, vegetables, nuts, dairy and starchy products and their combinations. In terms of composition, the main focus was on 'avoiding' high salt, sugar and/or fat foods and promoting wholegrain, fresh foods etc. Some recommendations mentioned the importance of improving nutrient and fibre intake and reducing disease risk factors as a rationale for the guidance ($n = 53$) but specific references were rarely provided.

Conclusion: Based on global recommendations, 'healthier' snack options are available in various food groups, but guidance on specific characteristic are rarely provided. Future work could translate this existing guidance to specific energy/nutrient targets for the development of "healthier" snacks and consumer guidance.

PO1.179

PPP-case Zwolle Healthy City, The Netherlands

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In Zwolle Healthy City exists since 2011 a public private partnership between 6 public organisations and 9 local based private companies. They contribute to the local program with money, expertise, strategic power, communication and youth activities. In 2012 one of the companies suggested to realize a so called Sutu in two of the priority neighbourhoods (where overweight and obesity rates are high). A Sutu is an interactive soccer wall, where a ball is kicked at a computerized object. It represents the Ottawa-charter: make the healthy choice the easy choice (and adjust the environment). If children like computer games, don't send them away from the screen, but replace the screen to the open field and let them play with it in an active way. The idea was embraced by all the partners and together with the community principals they raised €150.000,-. The first Zwolle Sutu was opened in October 2013. The public organisations have promised that they organize attractive, social activities in and around the Sutu's. The public-private partnership was intensified and improved by this mutual goal because everybody could contribute to the project with their own, unique qualities. The companies financed and adopted the SUTU-wall and the public parties organized more activities in the park. In June 2013 Zwolle presented the results of a three year monitoring survey indicating that the overweight rates under children up to 12 year have been declined since 2009 with several percent's. In this presentation we will give an overview of Zwolle Healthy City by a 4 minutes movie and will we will explore the public private partnership in the city.

PO1.180

A modified 'Priority Setting Partnership' for obesity prevention policy in Australia: Investigating the recommended levels of intrusiveness

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The World Health Organisation has urgently called for government leadership to tackle childhood obesity. Unfortunately there is no silver bullet, and conflicting stakeholder opinions enhance the difficulty of prioritising policies to reduce obesity. There is societal concern around implementing intrusive strategies and subsequently developing a 'nanny state', which has deterred governments from taking action. An investigation into the 'in-

trusiveness' of obesity policy options, as a barrier to potentially successful strategies, is warranted to further understand its role in delaying action. Priority Setting Partnerships (PSP) have been employed in the UK as a patient-centred method to prioritise treatment uncertainties for various medical conditions. Our research builds on the core values of this method, to develop a modified -PSP which unites the consumer, policymaker and public health practitioner to prioritise policy options of varying levels of intrusiveness, in isolation from commercial interests. Final data collection will be complete by March 2016, and qualitative and quantitative methods of analysis will identify ten top priorities for obesity prevention policy in Australia, from an integrated public and political perspective. Importantly, the PSP will provide insight on the extent to which evidence for effectiveness, intrusiveness and autonomy govern prioritisation of policy options by stakeholders.

PO1.181

Estimation on obesity related health care expenditures in Hungary, 2013

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Background. Obesity is an issue in health care provision in most of the countries. Obese patients usually consume more and more expensive services. The aim of the study was to estimate the financial expenditures of these provisions in Hungary. Method. Data of the Hungarian National Health Insurance Fund Administration were collected in 2013 regarding finances of secondary care and hospital services and health insurance reimbursement for medications, based on the ICD codes of selected morbidities (diabetes, hypertension, stroke, ischaemic coronary and congestive heart failures, knee-osteoarthritis, lipid lowering treatment). Sickness leave payments were also included. Obesity/overweight was counted by 80% incidence rate among diabetics and 60% among other morbidities.

Results. The estimated total public health expenditures were 105,500 Million HUF (≈337 Million Euro) and the financial contributions of patients were 37,667 Million HUF (≈120 Million Euro). These data represent a 12.44% of the whole national health services budget (908,011 Million HUF≈2,901 Million Euro) and 25.7% of the whole drug-reimbursement budget (296,024 Million HUF≈946 Million Euro).

Conclusion: Although expenditures related to the illnesses analyzed in the paper represented 0.48% of the national GDP, considering other morbidities and other patient's expenses, the real ratio could be around 1%. The increasing number of overweight and obese persons requires more public health and much more governmental awareness in Hungary.

PO1.182

Future prevalence of hypertension and diabetes in the Mexican obese adult population by 2030. Results: From the Mexican Obesity Model (MexOb-Model)

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Background. Obesity is one of the principal problems worldwide. In Mexico, it has been increasing substantially since the 1980's. As a consequence, the country has seen an increase in morbidity from its associated diseases, particularly hypertension and diabetes. This has created a big health and economic burden to Mexico and its inhabitants. Objective. To estimate the future obesity prevalence in the Mexican adult population from 2015 to 2030, and assess the health impact on its associated diseases: hypertension and Type 2 diabetes.

Methods. The Mexican obesity model (MexOb-Model) is a newly developed discrete-state open-cohort Markov Model that estimates the health im-

pact of the future trends of obesity (BMI ≥30kg/m²) on its associated diseases in the adult population (20 to 80 years old). To feed the model, we used five Mexican nationally representative health examination surveys, and Mexico's mortality data and population projections. We projected the sex-specific prevalence of hypertension and Type 2 diabetes in the obese population. Analyses were performed in three five-year period cycles to represent the 15 year period from 2015 to 2030.

Results. Prevalence of obesity in the adult population in Mexico is expected to increase from 29% and 39% in 2015 to 36% and 49% in 2030 among men and women respectively. In 15 years' time, there may be 40 million Mexican adults with obesity, 43% of the total population. Of this population with obesity, 53% of men and 47% of women will be hypertensive by 2030, and 30% of men and 25% of women will have Type 2 diabetes by that time.

Conclusion. The prevalence of obesity, and of obesity related hypertension, and diabetes, are expected to increase in Mexico if effective measures for reducing obesity are not put into action immediately. A reduction of as little as 1% a year in the prevalence of obesity could result in a significant reduction in the health and healthcare burden associated with obesity in Mexico.

PO1.183

Meeting maternal needs? The interpretation of obese pregnant women's needs in public health policies

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Background: In many western welfare states obese pregnant women are categorized as a special target group in public health policies. Recent critical obesity studies argue that this categorization result in a number of unintended negative consequences such as stigmatization of the obese pregnant body. While these critical studies have valid points they nevertheless neglect an important discussion, namely whether the targeting of obese pregnant women is not only about stigmatization but also about recognition of unmet needs for extra antenatal care. Drawing on the work of leading social philosopher Nancy Fraser, this paper shows that maternal needs are not necessarily objectively given but rather the result of political struggles between different actors, e.g. scientists, public officials, professionals, NGOs, and individual mothers.

Objectives: The study investigates how obese pregnant women are targeted in public health policies as a high-risk group in need of extra antenatal care and discuss whether these policies transform or affirm inequalities and obesity stigma.

Material/Methods: Official Danish antenatal care guidelines and health promotion material are analyzed using the methodology of critical discourse analysis. The analysis is guided by the following two questions: how are obese pregnant women categorized as a risk group? How are the obese pregnant women's needs for antenatal care interpreted by the key actors in the Danish health care system?

Results: Preliminary results show that needs of obese pregnant women are not uniformly interpreted across the Danish health care system. Within the same health care system policies that affirm inequalities and obesity stigma co-exist with ones that aim for transformation.

Conclusion: This ambiguity, the paper argues, means that the understanding of obese pregnant women's needs are not fixed, which creates possibilities for new struggles of need interpretations and room for asking obese pregnant women themselves what they need.

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The Roadmap to a Healthier Future for Children and Adolescents in the United Arab Emirates-A UNICEF-led Programme

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Background & Aims: Childhood and adolescent obesity has become a major public health problem in the UAE. According to the 2010 UAE Global School Health Survey, approximately 40% of children in the UAE are overweight or obese; double the prevalence found in the 2005 survey.

Objectives: The aim of the program was to bring the issue of obesity to the forefront of social concern influence political dialogue to reduce the prevalence of obesity among children and adolescents in the UAE through increasing the awareness on how to lead a healthier lifestyle and reduce their risk of disease.

Material/Methods: In 2009, UNICEF carried out a 3 months National Awareness Campaign raising awareness on the issue of obesity across the UAE community. Between 2011 and 2015, a comprehensive 1-year co-ordinated school health programme was developed and implemented in 21 government schools across the UAE. In 2014, UNICEF advocated the use of participatory learning approach to health education of students and generated partnership and capacity strengthening at the national level to ensure sustainability.

Results: UNICEF's partnership and advocacy led policymakers to implement new strategies to address health issues in schools. In 2010, strict guidelines on school food and drink provision was passed. New health policies have also been developed requiring schools to shift focus from 'education only' to include health promotion as well. Health education sessions are now a mandatory part of the school curriculum. In 2011, School Health and Health Promotion Committees were mandated by the UAE government to set standards concerning nutrition and health. In 2015, Health authorities in the UAE developed interactive health education manual, trained health educators in schools on using a skills-based approach, and announced mainstreaming this across all schools in the UAE.

Conclusion: Following the success of the program, UNICEF is continuing its work by supporting the government's national campaign to reduce the prevalence of Child Obesity to 12% in 2021.



Fig. 1. Healthier School Canteens



Fig. 2. Parent Workshop on healthy choices

PO1.185

Anthropometric descriptive study of the population of the rural community of Cosoltepec, Oaxaca, Mexico

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In Mexico, the nutritional assessment of marginalized populations is scarce, and therefore there is no much information about these groups because current studies show a greater presence in the higher socioeconomic levels and in urban areas than in rural areas. Oaxaca is the state with the largest number of ethnic groups, accounting for 53% of the total indigenous population of Mexico, and therefore it is an excellent field for the study of vulnerable groups. The evaluation was conducted in the population of the rural community Cosoltepec in the State of Oaxaca, with the participation of 180 people in the population, of which personal, clinical, diet and family history data were collected through a survey; also anthropometric measurements (waist, height, weight) were taken, measuring blood pressure at the adult population, nutritional information was collected through a 24 hours questionnaire; for statistical evaluation of data Babel R-sigma program was used. According to the results obtained in this study and based on anthropometric parameters and dietary reference, we observed that the nutritional status of the evaluated population is poor, the problems of malnutrition and overfeed co-exist with increasing frequency. Considering anthropometric parameters and dietary reference it is noted that the nutritional status of the population is deficient. In adults, 72.41% had a high percentage of body fat and 60.34% a high BMI, while 78.45% adults presented values of waist circumference above the established by the IDF (2006); additionally, energy intake was 1221.23 kcal/day,

and consumption of macronutrients, micronutrients and fiber is not ideal, all manifested a latent problem in the adult population. In infants it was observed that 37.5% are underweight, with an average of 1768.05 kcal/day, and intake of nutrients according to the recommended intakes caloric intake is better in infants than in adults. Noncommunicable diseases such as diabetes, obesity and heart disease, and high levels of cardiovascular risk that are often the result of changes in diet and lifestyle, are increasingly affecting indigenous people.

PO1.186

Prevalence trends of overweight and underweight children from Romania – pooled analysis of cross-sectional studies between 2006 and 2015

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As high-quality national representative data on obesity in Romanian children are needed to shape public health policies, we aimed to provide a unified data on national prevalence and trends of underweight, overweight and obese in Romanian children aged 6–19 years, across the last decade (2006–2015).

Methods: Using a common protocol, we selected published and unpublished studies that measured Romanian children in schools, between 2006–2015. Children's body mass index was classified using the current WHO, IOTF, and CDC references.

Results: 25060 children from 8 Romanian counties were included in the analysis. The prevalence of underweight children was 5%/4.5%/8.5% (WHO/IOTF/CDC), while the prevalence of overweight (including obese) children was 28.3%/23%/23.2% (WHO/IOTF/CDC). The prevalence of overweight children did not change significantly over the last decade (Chi-square, $p = 0.6$).

Conclusion: While the prevalence of underweight children was low, almost one in four children was overweight or obese, in Romania, between 2006–2015. This prevalence remained relatively stable across the last decade.

PO1.187

The challenges of health economic analyses of nutritional interventions in obesity

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Background. The prevalence of obesity is placing a substantial burden on health care resources, particularly in developed countries. The role of nutritional intervention in obesity to optimize the use of scarce resources is therefore of interest for healthcare decision makers. A favourable impact of nutrition in obesity will improve healthcare expenditures and quality of life. In health economics, an analysis of the costs and effects of a healthcare technology by means of a cost-effectiveness analysis has become an established tool for reimbursement decisions for innovative medicines. However, standard health economic techniques cannot be always applied

to assess the cost-effectiveness of nutritional intervention in obesity. Objective The objective is to present specific methodological issues for the health economic assessment of nutritional interventions in obesity.

Methods: Many different comparative treatments exist for management of obesity in daily practice (surgery, diet, drug therapy, physical exercise and lifestyle), which do not always have sufficient clinical evidence from RCTs. There is a parallel between the methodologies for extrapolation of intermediate outcomes to long-term outcomes between a cost-effectiveness analysis for pharmaceutical or nutrition, as long as the clinical evidence for nutrition fulfills the requirements for pharmaceuticals. However, in nutrition the evidence may not always come from RCTs, but may be based on observational data. Therefore the clinical evidence of nutrition in itself is not the issue, but the handling of clinical evidence from observational studies. Finally the impact of selection bias and confounding effects is much larger in obesity because of heterogeneous patient populations, multiple co morbidities (e.g. diabetes, cardiovascular disease), and risk factors.

Conclusion: Up to recently, no specific approach has been published for the health economic assessment of nutritional interventions in obesity in spite of clear needs from policymakers. To correspond to the complexity of the health economic assessment of nutritional in obesity, there is a need to generate adapted methodologies and guidance in order to correctly express the impact of nutrition in obesity in health economic values.

PO1.188

School Fruit Scheme effectiveness is improved when a nutrition education program supports fruit distribution: An Italian trial

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Background & Aims: The School fruit Scheme provides children with fruit and vegetables (FV) to encourage good eating habits. Member States are required to include additional measures. FV are key components of the Mediterranean diet (MD) which may be health-promoting also for younger populations.

Objectives, Material & Methods: To evaluate the effects of a nutrition education program (school and home activities), led by previously trained teachers, within the Italian School Fruit Scheme, on 4th grade children's diet quality/adherence to the MD. A representative cluster sample of 494 pupils (included control), during the 2014–2015 academic year, was investigated. Body weight and height were measured. Ponderal status was assessed by the IOTF definitions. Pre and post intervention dietary habits and lifestyle were assessed by the KIDMED test (administered individually) and questionnaires.

Results: Interesting changes occurred regarding healthy eating. The proportion of children with medium-high adherence to the MD significantly increased after the intervention in total sample, in females and in the South of Italy. No significative changes in the levels of adherence were observed with regards to ponderal status. As for the KIDMED test, a significative increase was observed in the proportion of children who ate a fruit or fruit juice everyday in total sample (80.5% in pre-intervention vs 92.9% in post intervention), and in both males and females, and in all geographical areas; a second fruit every day in total sample (33.4% in pre-intervention vs 45.8% in post intervention), in males and in females, and in the South; fresh or cooked vegetables regularly once a day in total sample (62.0% in pre-intervention vs 72.7% in post intervention), in males and in females, in the Centre and South; fresh or cooked vegetables more than once a day in the total sample (25.6% in pre-intervention vs 31.4% in post intervention), and in the South.

Conclusion: School-based programmes seem to be effective to improve the diet quality in children, in particular FV consumption. Effectiveness might be higher if teachers are adequately trained about the program, before using it. Conflict of interest statement The authors declare that there are no conflicts of interest.

PO1.189

Eating Disorder Score Is Associated With Orthorexia In Female

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Introduction: Eating disorder is a condition that psychological foundations and effects individual's life quality. Because of changing eating behavior of individuals, it is characterized by being underweight and it can also lead to obesity by the loss of eating control. In addition, it is thought that orthorexic trend is associated with eating disorders.

Methods: This study was planned to determine some anthropometric measurements individuals with and without eating disorders was conducted with 375 male and 375 female. Eating disorder and orthorexia were evaluated with EAT-40 and ORTO-15 tests respectively. In EAT-40 test having 40 points and more was identified as eating disorder. Participants body weight (kg), height (cm) and waist circumference measurements were taken according to appropriate methods. Body mass index (BMI) was calculated and divided into 4 groups as underweight, normal, overweight and obese according to the WHO classification.

Results: At the end of the study, 2.9% of male and 4.3% of female have eating disorder. Between BMI groups there was no significant difference according to mean EAT-40 scores, but it was found to be higher than the mean EAT-40 score in underweight female group with statistically borderline significance ($p = 0.053$). The mean EAT-40 score in the study were found to be higher in female with a high waist circumference values ($p < 0.05$). Additionally, a negative relationship was observed between EAT-40 and ORTO-15 scores in female ($r = -0.272$; $p < 0.05$). Statistically significant result were not obtained in male.

Conclusion: According to these results; It should be considered that eating disorders occur in individuals both underweight and increased risk of disease according to the waist circumference. Further, it has been found that the risk of eating disorders increased in female with orthorexia.

PO1.190

Maternal weight and body composition trajectories postpartum analysed by Body Mass Index category

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Background & Aims: There are gaps in knowledge about changes in maternal weight and body composition after childbirth (1,2). The aim of this longitudinal study was to examine trajectories in maternal weight and body composition between early pregnancy and four and nine months postpartum.

Materials & Methods: Maternal weight and body composition were measured using Bio-electrical Impedance Analysis at the first antenatal visit and subsequently at four and nine months postpartum.

Results: Of 1035 women recruited before 18 weeks gestation, 1018 delivered a baby at the Hospital, 494 returned at 4 months postpartum and 328 returned at 9 months postpartum. Of the 328 women who attended all appointments, mean weight at the antenatal visit was 69.3 ± 14.3 kg, BMI was 25.3 ± 5.0 kg/m² and 14.4% were obese. Four months postpartum, the mean change in weight from the first antenatal visit was $+1.6 \pm 4.2$ kg, change in BMI was $+0.6 \pm 1.5$ kg/m² and 19.2% were obese. Nine months postpartum, the mean change in weight from the first antenatal visit was $+0.2 \pm 4.7$ kg, BMI change was -0.06 ± 1.8 kg/m² and 16.8% were obese. Proportionate changes were observed in fat mass and fat-free mass. When analysed by BMI category, non-obese women had gained weight at four months postpartum, but had lost most of the gain by nine months. In contrast, obese women lost weight at four months postpartum, but had gained weight by nine months.

Conclusion: Trajectories in maternal weight and body composition after pregnancy were not linear, and were different in obese compared with non-obese women. These findings will inform research studies and public health interventions intended to tackle postpartum weight gain.

Acknowledgments: This work was partially funded by an unlimited educational grant from Danone which we acknowledge with gratitude. We also acknowledge with gratitude the participation of the pregnant women. References 1 Messina J, Johnson M, Campbell F et al. Systematic review of weight management interventions after childbirth. London: National Institute for Health and Clinical Excellence; 2009. 2 Institute of Medicine. Weight Gain During Pregnancy: Reexamining the Guidelines. Washington, DC: The National Academies Press; 2009

PO1.191

To enhance or diminish autonomy in responding to obesity: Similarities and differences across stakeholder recommendations

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The ethical concern of a 'nanny state' averts governments from implementing cohesive policies for obesity prevention. This study explored the similarities and differences in policy options, proposed by different stakeholder groups, through constructs of intrusiveness and autonomy. We conducted a content analysis of submissions to the Australian Government's Inquiry into Obesity (2009), sub-grouped by stakeholder perspective and categorised by intrusiveness to choice. Submissions ($n = 158$) were made by academia (23%), industry (18%), public health specialists (16%), NGOs (15%), consumers (13%), public providers (11%) and policymakers (5%). Key findings demonstrated that enhancing autonomy for dietary change was the most frequent recommendation by all groups. Consumers recommended diminishing autonomy to the greatest extent, whilst industry and policy makers suggested this least frequently. To improve dietary choice, industry were the only group not to recommend diminishing autonomy. To increase physical activity, consumers were the only group to recommend reducing autonomy more frequently than enhancing autonomy. This analysis illustrates the diversity of perspectives involved in obesity, and the significance of industry and academia in influencing policy decisions. Given the consensus across stakeholder groups favouring policies which enhance autonomy, consideration of the influence of policy on autonomy could provide governments with a tool to prioritise action on obesity.

PO1.192

Assessment of obesity: Alternative indexes to BMI

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Obesity is a chronic disease characterized by increased fat mass. However it's essential the assessment of body fat to determine obesity. Body mass index (BMI) has been used to classify obesity but it is a single predictor and couldn't clearly provide information about fat mass and abdominal obesity. Researchers have focused on different indexes related to obesity. Body adiposity index (BAI), based on hip circumference and height, refers to percentage body fat (BF). BF estimation from BAI is controversial but some studies revealed that BAI is a better predictor than BMI especially in African American, Mexican Americans. Conicity index (CI) is an abdominal adiposity index, including some girth measurements (waist circumferences for height and weight). This index is superior to BMI to assess abdominal fat distribution. Further BAI and CI are better predictors for diabetes mellitus, cardiovascular diseases according to some studies. Body fat index (BFI) is obtained from parietal fat multiplied by visceral fat (mm) then divided by height. Nassr et al (2016) specified that BFI is more informative than BAI and associated with hypertensive disorders in pregnancy. Visceral adiposity index (VAI), based on WC, BMI, TG and

HDL-C, provide information about visceral fat as BFI and also associated with cardiometabolic risk. A Body Shape Index, calculated from WC, BMI, height, has found to be good indicator for visceral adiposity and the risk of premature mortality. It's important to evaluate obesity with easy and accurate methods and these indexes are simple and noninvasive to determine obesity. References 1.A Better Index of Body Adiposity. *Obesity* (Silver Spring).2011,19(5):1083–1089. 2.Adiponectin levels and waist circumference, waist-hip ratio and conicity index in type 1 diabetes patients. *Diabetology&Metabolic Syndrome*.2015,7(1):86. 3.A New Body Shape Index Predicts Mortality Hazard Independently of Body Mass Index. *PLoS One*.2012,7(7). 4.Body adiposity index as a risk factor for the metabolic syndrome in postmenopausal Caucasian, African American, and Filipina women. *Diabetes&Metabolic Syndrome: Clinical Research&Reviews*.2015,108–113. 5.Body fat index: A novel alternative to body mass index for prediction of obstetric complications. *American Journal of Obstetrics&Gynecology*.2016, S67. 6.Significantly Increased Visceral Adiposity Index in Prehypertension. *PLoS One*.2015,10(4).

PO1.193

How the level of self-sufficiency breastfeeding affects the success breastfeeding ?

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The importance of breastfeeding for children, mothers and society are apparent. American Academy of Pediatrics recommends that mothers breastfeed exclusively for approximately the first 6 months after their child's birth and continue breastfeeding for at least the first year of their child's life (1). One of the most important factors affecting breastfeeding is mothers' breastfeeding self-efficacy. There was a statistically significant relation between the score averages of postnatal breastfeeding self-efficacy of mothers and score averages of LATCH breast feeding success (2). Breastfeeding self-efficacy perception shows her thoughts on breastfeeding and ability to cope with the emotional challenges faced in the breastfeeding process (3). It is stated that this perception is subjected to pause or interruption of breastfeeding is low (4). In a study, during postpartum period %53,6 of mothers having babies between 0–6 months only breastfeeding their babies. There is a significant difference between breastfeeding self-efficacy perception and information resources on breastfeeding, breast feeding level, negative thoughts about the amount of milk and the weight of the baby (5). The creation of self-confidence will ensure the continuity of breastfeeding. Breastmilk is the best food which provide the baby's physical and mental development. Consequently, training course should be organized about supporting and motivating to mothers for breastfeed their babies. 1. American Academy of Pediatrics, Section on Breastfeeding. *Pediatrics*.2005;115 (2):496– 506 2. Yenil, Kezban, et al. "The relation between breastfeeding self-efficacy and breastfeeding success in mothers." *Journal of Education and Research in Nursing* 10.2 (2013): 14–20. 3. Dennis CL, Fauz S. Development and psychometric testing of the Breastfeeding Self-Efficacy Scale. *Research in Nursing & Health* 1999; 22(5):399–409 4. Küçüköğlu, Sibel, and Ayda Çelebioğlu. "Hasta Yenidoganların Annelerinin Emzirme Özyeterlilik Düzeyi Ve Emzirme Başarılarının İncelenmesi." *ERÜ Sağlık Bilimleri Fakültesi Dergisi* 2.1 (2014): 1–11. 5. Arslan, C. Doğum sonu dönemde emzirme öz yeterliliği ve ilişkili faktörlerin belirlenmesi. Selçuk Üniversitesi Sağlık Bilimleri Enstitüsü, 2011.

PO 1 – Clinical Management I

PO1.194

NHANES: Prevalence of prediabetes and diabetes by body mass index in US adults

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Background: Increasing prevalence of obesity in the US is associated with rising prevalence of prediabetes and its associated complications.¹ Prediabetes prevalence estimates vary depending on diagnostic criteria.

Objectives: To compare the prevalence of prediabetes and diabetes across body mass index (BMI) categories using the American Diabetes Association (ADA) 2010 criteria² for HbA1c, fasting plasma glucose (FPG) and 2-hour plasma glucose (2-h PG) and to evaluate the impact of glycaemic status and BMI on comorbidities.

Material/Methods: National Health and Nutrition Examination Survey (NHANES) data 2009–10 and 2011–12, corresponding to a representative sample of 12,391 US adults (aged ≥18 years), were combined. Absolute values and weighted frequencies were used to estimate glycaemic status (defined by HbA1c, FPG, or 2-h PG, according to ADA, 2010) by BMI class (18.5–24.9, 25.0–29.9, 30.0–34.9, 35.0–39.9, ≥40.0 kg/m²). Associations between glycaemic status and relevant comorbidities by BMI were assessed using Proc Surveylogistic in SAS, with regression analysis adjusted for age and gender.

Results: Across all three ADA definitions, prevalence of prediabetes and diabetes generally increased with BMI, and was higher with HbA1c (range: 17.7–36.3% and 2.7–23.9%, respectively) and FPG (range: 25.0–44.0% and 3.6–22.5%, respectively) vs. 2-h PG (range: 9.5–22.0% and 2.4–13.0%, respectively). Across ADA criteria, prevalence of hypertension and dyslipidaemia generally increased with BMI and was higher with prediabetes (range for hypertension 22.1–54.2% and dyslipidaemia 12.1–50.1%) vs. diabetes (range for hypertension 8.5–32.6% and dyslipidaemia 4.1–28.2%).

Conclusion: Prevalence of prediabetes and diabetes varied depending on which ADA definition was used; the general trend across all three definitions was increasing prevalence with increasing BMI. Hypertension and dyslipidaemia were more prevalent in individuals with prediabetes vs. those with diabetes, regardless of ADA criteria.

References:

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LCZ696 improves lipid mobilization from adipose tissue: A randomized, double-blind, active-controlled, parallel-group study in obese hypertensive patients

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LCZ696 simultaneously inhibits neprilysin, thereby augmenting natriuretic peptide (NP) availability, and blocks AT1-receptors. NPs released during exercise promote lipid mobilization and oxidation. Therefore, we investigated whether LCZ696 treatment augments lipid mobilization and oxidation at rest and during exercise. In this double-blind study, 98 patients with mild-to-moderate hypertension and abdominal adiposity were randomized to LCZ696 400 mg or amlodipine (AML) 10 mg once daily for 8 weeks. At baseline and week 8, abdominal subcutaneous adipose tissue lipolysis (microdialysis), whole-body lipolysis (glycerol tracer kinetics), and substrate oxidation and energy expenditure (indirect calorimetry) were assessed at rest and during exercise (60 min cycling at approximately 50% of peakVO₂). LCZ696 and AML groups had comparable baseline characteristics with regards to age, blood pressure and body mass index (LCZ696 32.6 ± 4.6 kg/m², AML 33.3 ± 4.4 kg/m²). Abdominal subcutaneous adipose tissue lipolysis at rest was increased with LCZ696 compared to AML (interstitial glycerol concentrations at week 8; 80.5 μmol/L vs. 64.0 μmol/L; p = 0.020). The apparent exercise-induced increase in adipose tissue lipolysis was more pronounced with LCZ696 compared to AML at 15 and 30 min of exercise (interstitial glycerol concentrations at week 8; 15 min exercise: 153.1 μmol/L vs. 128.8 μmol/L, p = 0.014; 30 min exercise: 187.63 μmol/L vs. 149.19 μmol/L, p = 0.010). However, whole-body lipolysis at rest and during exercise was not significantly different between groups. While respiratory quotient increased with exercise in both treatment groups, energy expenditure and substrate oxidation at rest and during exercise did not differ between treatments. In conclusion, 8 weeks of treatment with LCZ696 vs. AML increased lipid mobilization from abdominal subcutaneous adipose tissue at rest and during physical exercise in obese, hypertensive patients, while whole-body lipolysis and lipid oxidation remained unchanged. This study therefore suggests an improvement in lipid mobilization with LCZ696 and supports a central role of NPs in the crosstalk between human cardiovascular and metabolic regulation.

Evaluation of the determinants of blood pressure improvement after bariatric surgery in patients with morbid obesity and hypertension

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Background/Aims: Hypertension is one of the most frequent comorbidities in patients with morbid obesity. The determinants of blood pressure (BP) improvement after bariatric surgery are still a matter of debate. Therefore, our aim was to characterize the determinants of BP control improvement after bariatric surgery.

Methods: We evaluated a cohort of 342 patients (85.7% women) with pharmacologically treated hypertension that were submitted to bariatric surgery. We analysed the impact of preoperative parameters age, sex, BMI, waist-to-hip ratio (WHR), systolic BP (SBP), diastolic BP (DBP), diabetes, dyslipidaemia, smoking, glomerular filtration rate (GFR), C-reactive protein (CRP); type of surgery (adjustable gastric band, Roux-en-Y gastric bypass or sleeve gastrectomy) and the weight lost after surgery on the improvement of BP control (reduction of the number of anti-hypertensive drugs with SBP < 140mmHg and DBP < 90mmHg) 12 months after surgery. The statistical analysis was done with Mann-Whitney test, Pearson correlation and multiple regression.

Results: Bariatric surgery promoted a significant improvement in BP control (47.4% with improvement, 6.7% with worsening, P < 0.001). The group of patients with improvement of BP control was younger [49,5(41,8–57,0) vs 55,0(48,0–61,0) years, P < 0,001] and had a lower BMI [42,78(40,42–46,64) vs 44,36(40,89–48,11)kg/m², P = 0,037]. In a model of regression including the preoperative variables and the type of surgery, Roux-en-Y gastric bypass was associated with a more frequent improvement in BP control than adjustable gastric band and sleeve gastrectomy (56.9% vs 28.0% vs 41.1%, P < 0.001). After adjusting to weight loss after surgery, the improvement in BP control was not significantly different between types of surgery and a significantly better BP control was observed in patients with more weight loss (p = 0.037). Sex and preoperative WHR, SBP, DBP, smoking status, diabetes, GFR and CRP did not influence significantly BP control.

Conclusion: Bariatric surgery contributes to an improvement in BP control in patients with morbid obesity. The greater impact in BP control of Roux-en-Y gastric bypass appears to be dependent on the greater weight loss that this technique promotes.

The risk factors of non-alcoholic fatty liver disease among Korean adolescents

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Background: Non-alcoholic fatty liver disease (NAFLD), the most common cause of chronic liver disease in pediatric population, is currently increasing in Korea. The objective of this study is to evaluate risk factors of NAFLD in Korean adolescent by using cross-sectional data from the 2013 Korean National Health and Nutrition Examination Survey.

Methods: We analyzed 476 subjects (229 boys 229 and 247 girls) aged 13–19 years without history of viral or toxic hepatitis and excessive alcohol use. In this study, NAFLD was defined as serum ALT levels higher than 35 mg/dL. We also used modified NCEP ATP III criteria to diagnose metabolic syndrome in adolescents. The association between NAFLD and risk factors was evaluated by multivariate logistic regression after taking account of the sample weights and complex sample design.

Results: The prevalence of NAFLD was 5.9% in this study group. Boys had higher odds ratio for NAFLD (OR 11.13; 95% CI 2.37–52.22) than girls. In multivariate logistic regression analysis, the odds ratios of NAFLD increased significantly in obese adolescents whose BMI at or above 95 percentile for age and sex (OR 31.81; 95% CI 9.87–102.57) than those with normal BMI. Additionally, the odds ratios (95% CI) for NAFLD were 3.36 (1.09–10.36), 3.39 (1.17–9.87) in the subjects with family history of diabetes and hypertension, respectively. Among components of metabolic syndrome, abdominal obesity (OR 11.41; 95% CI 4.24–30.70), impaired fasting glucose (OR 12.62; 95% CI 1.53–104.01), and hypertriglyceridemia (OR 3.88; 95% CI 1.53–9.79) were significantly associated with NAFLD.

Conclusion: Obesity, abdominal obesity, impaired fasting glucose, and hypertriglyceridemia was significantly associated with NAFLD in Korean adolescents. In addition, family history of diabetes and hypertension showed strong association with NAFLD. Therefore, further evaluations and proper managements for NAFLD are suggested in adolescents with such risk factors.

NAFLD, nonalcoholic fatty liver disease; HDL-C, HDL cholesterol *Analyzed using chi-square test for categorical variables.

Table 1. Demographic and life style factors in the subject with NAFLD and without NAFLD

NAFLD, nonalcoholic fatty liver disease; HDL-C, HDL cholesterol *Analyzed using chi-square test for categorical variables.

Variables	Subject without NAFLD	Subject with NAFLD	P value*
	n(%)	n(%)	
Sex			< 0.001
Girls	245(52.4)	2(9.9)	
Boys	210(47.6)	19(90.1)	
Income			0.617
Low	115(25.2)	7(31.8)	
Low-moderate	117(27.1)	3(18.8)	
Moderate-high	120(25.7)	7(34.4)	
High	102(21.9)	4(14.9)	
Body mass index (percentile)			<0.001
Normal (< 85)	372(6.8)	5(21.0)	
Overweight (85–95)	56(11.5)	5(24.1)	
Obesity (≥95)	27(5.9)	11(54.9)	
Family history			
Diabetes	32(6.8)	5(21.6)	0.017
Hypertension	67(14.2)	8(36.7)	0.011
Dyslipidemia	17(3.9)	2(10.3)	0.219
Metabolic syndrome			
Abdominal obesity	31(7.1)	10(49.1)	< 0.001
High blood pressure	19(4.7)	3(13.5)	0.105
Impaired fasting glucose	2(0.5)	2(9.4)	< 0.001
Hypertriglyceridemia	91(18.9)	10(45.1)	0.005
Low HDL-C	81(18.4)	6(30.2)	0.230
Overconsumption of intake	171(38.8)	5(19.9)	0.088
Current smoker	23(6.6)	3(13.8)	0.232
Alcohol usage	68(17.1)	4(25.0)	0.414
Lack of physical activity	167(37.7)	9(43.7)	0.581
Sleep < 8 hours	301(66.2)	13(60.1)	0.584

Table 2. Factors associated with increased odds ratios (ORs) of NAFLD
NAFLD, nonalcoholic fatty liver disease; HDL-C, HDL cholesterol; CI, confidence interval *Adjusted for age and income †Adjusted for sex, age and income ‡Percentile for age and sex §Odds ratio for impaired fasting glucose cannot be calculated due to insufficient subjects

Variables	Univariate logistic regression		Multivariate logistic regression*		Multivariate logistic regression†	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Sex						
Girls	1	0.004	1	0.002	—	
Boys	9.98 (2.16–46.78)		11.13 (2.37–52.22)			
Body mass index						
Normal (< 85‡)	1	<0.001	1	<0.001	1	< 0.001
Overweight (85–95‡)	8.24 (2.06–32.89)		9.14 (2.34–35.66)		12.69 (2.62–61.59)	
Obesity (≥95‡)	36.40 (11.25–117.85)		31.81 (9.87–102.57)		48.45 (11.29–208.90)	
Family history						
Diabetes	3.79 (1.18–12.20)	0.026	3.36 (1.09–10.36)	0.035	4.54 (1.31–15.76)	0.018
Hypertension	3.50 (1.28–9.57)	0.015	3.39 (1.17–9.87)	0.025	3.08 (1.01–9.35)	0.047
Dyslipidemia	2.84 (0.50–16.19)	0.239	2.60 (0.41–16.70)	0.311	4.03 (0.69–23.55)	0.121
Metabolic syndrome						
Abdominal obesity	12.64 (4.99–32.04)	<0.001	11.41 (4.24–30.70)	<0.001	17.11 (5.48–53.36)	< 0.001
High blood pressure	3.15 (0.73–13.53)	0.123	2.97 (0.61–14.37)	0.174	1.66 (0.30–9.16)	0.560
Impaired fasting glucose	19.95 (2.41–165.16)	0.006	12.62 (1.53–104.01)	0.019	N/A§	
Hypertriglyceridemia	3.53 (1.40–8.88)	0.008	3.88 (1.53–9.79)	0.004	3.59 (1.40–9.16)	0.008
Low HDL-C	1.92 (0.65–5.67)	0.237	2.30 (0.77–6.85)	0.134	1.89 (0.53–6.69)	0.321
Overconsumption of intake	0.39 (0.13–1.19)	0.099	0.43 (0.14–1.31)	0.136	0.42 (0.14–1.32)	0.138
Current smoker	2.28 (0.57–9.22)	0.244	2.06 (0.50–8.57)	0.318	1.26 (0.30–5.36)	0.756
Alcohol usage	1.61 (0.50–5.17)	0.418	0.85 (0.26–2.74)	0.778	0.65 (0.20–2.14)	0.473
Lack of physical activity	1.28 (0.53–3.11)	0.582	1.10 (0.44–2.72)	0.837	1.48 (0.57–2.84)	0.413
Sleep < 8 hours	0.77 (0.29–2.00)	0.585	0.69 (0.24–1.95)	0.478	0.72 (0.22–2.32)	0.577

PO1.198

Effect of Omega-Loop-Gastric-Bypass on cardiovascular risk factors in patients without and with diabetes mellitus Typ II

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Background & Aims: Obesity is associated with increased risk for cardiovascular (CV) disease [1]. Bariatric surgery improves CV risk [2], however data on Omega-Loop-Gastric-Bypass (OLGB) is lacking.

Objectives: The aim was to determine the impact of OLGB on CV risk factors in patients with (DM) and without (NDM) diabetes Typ II.

Material/Methods: Within our randomized controlled trial [3], we prospectively evaluated the respective parameters preoperatively (T0) and 6 months postoperatively (T6). We used linear mixed model to assess effect of time and interaction for changes between DM and NDM (adjusted for baseline values, age, sex) and Pearson's correlation coefficient.

Results: 45 patients [78% women, age 42(13)years, BMI 44(4)kg/m², waist-circumference (WC) 129(10)cm] were analyzed. Following risk factors were present at T0 vs. T6: diabetes 29% vs. 21% (insulin units: 83IU vs. 25IU, p < 0.01), hyperlipidemia in NDM 19% vs. 12% and in DM 46% vs. 33%, and hypertension in NDM 34% vs. 24% and in DM 85% vs. 56% (NDM vs. DM: T0: p < 0.01, T6: n.s.). In total, all CV risk factors decreased [WC, triglycerides, total cholesterol, LDLc, cholesterol/HDLc-ratio, lipoprotein(a), apolipoproteinB (apoB), apoB/apoA1-ratio, high sensitive C-reactive protein (hsCRP), HOMA2-insulin resistance (IR), systolic blood pressure (RRsys)] (Table 1). Significant group differences could be detected in weight loss, WC, triglycerides, apoA1, hsCRP, HOMA2-IR and group and time interaction in weight loss, HDLc, and ApoA1. Significant correlations were found between weight loss and RRsys (r = -0.353, p = 0.002), triglycerides (r = -0.346, p < 0.001), HDLc (r = 0.193, p < 0.001), cholesterol/HDLc-ratio (r = -0.321, p < 0.001), hsCRP (r = -0.297, p < 0.001), and HOMA2-IR (r = -0.545, p < 0.001).

Conclusion: This evaluation highlights by decrease of WC, BMI, blood pressure, blood lipids, hsCRP, and insulin resistance the benefit of OLGB in reducing CV risk factors with group differences between NDM and DM. References [1] Heneghan HM, et al. Am J Cardiol. 2011 Nov 15;108(10):1499–507. [2] Vest AR, et al. Heart. 2012 Dec;98(24):1763–77 [3] Luger M, et al. Trials. 2015;16(1):328

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	T0			T6			Time			Group		
	Mean / SD	Mean / SD	p*	Mean / SD	Mean / SD	p*	Mean / SD	Mean / SD	p*	Mean / SD	Mean / SD	p**
n	45	45		45	45		45	45		45	45	
Age (y)	42.1 (13.2)	42.1 (13.2)	n.s.	42.1 (13.2)	42.1 (13.2)	n.s.	42.1 (13.2)	42.1 (13.2)	n.s.	42.1 (13.2)	42.1 (13.2)	n.s.
Weight loss (%)	12.8 (11.3)	12.8 (11.3)	n.s.	12.8 (11.3)	12.8 (11.3)	n.s.	12.8 (11.3)	12.8 (11.3)	n.s.	12.8 (11.3)	12.8 (11.3)	n.s.
RR sys (mmHg)	142 (19)	142 (19)	n.s.	128 (19)	128 (19)	n.s.	142 (19)	128 (19)	n.s.	142 (19)	128 (19)	n.s.
RR dia (mmHg)	85 (13)	85 (13)	n.s.	85 (13)	85 (13)	n.s.	85 (13)	85 (13)	n.s.	85 (13)	85 (13)	n.s.
Triglycerides (mg/dl)	148 (81)	148 (81)	n.s.	94 (31)	94 (31)	n.s.	148 (81)	94 (31)	n.s.	148 (81)	94 (31)	n.s.
Total cholesterol (mg/dl)	198 (48)	198 (48)	n.s.	168 (38)	172 (43)	n.s.	198 (48)	168 (38)	n.s.	198 (48)	168 (38)	n.s.
HDLc (mg/dl)	49 (13)	49 (13)	n.s.	47 (10)	45 (9)	n.s.	49 (13)	47 (10)	n.s.	49 (13)	45 (9)	n.s.
Cholesterol/HDLc ratio	4.3 (1.2)	4.3 (1.2)	n.s.	3.7 (0.8)	3.5 (0.8)	n.s.	4.3 (1.2)	3.7 (0.8)	n.s.	4.3 (1.2)	3.5 (0.8)	n.s.
LDLc (mg/dl)	121 (38)	121 (38)	n.s.	99 (21)	99 (21)	n.s.	121 (38)	99 (21)	n.s.	121 (38)	99 (21)	n.s.
Apolipoprotein A1 (mg/dl)	147 (39)	137 (29)	n.s.	125 (16)	122 (15)	n.s.	147 (39)	125 (16)	n.s.	147 (39)	122 (15)	n.s.
Apolipoprotein B (mg/dl)	108 (25)	111 (42)	n.s.	95 (25)	101 (31)	n.s.	108 (25)	95 (25)	n.s.	108 (25)	101 (31)	n.s.
ApoB/ApoA1-ratio	0.73 (0.21)	0.81 (0.22)	n.s.	0.77 (0.18)	0.78 (0.22)	n.s.	0.73 (0.21)	0.77 (0.18)	n.s.	0.73 (0.21)	0.78 (0.22)	n.s.
Apolipoprotein B (mg/dl)	99 (25)	99 (25)	n.s.	91 (27)	87 (18)	n.s.	99 (25)	91 (27)	n.s.	99 (25)	87 (18)	n.s.
hsCRP (mg/dl)	0.9 (0.9)	0.9 (0.4)	n.s.	0.5 (0.5)	1.1 (1.1)	n.s.	0.9 (0.9)	0.5 (0.5)	n.s.	0.9 (0.9)	1.1 (1.1)	n.s.
HOMA2-IR	2.8 (1.1)	2.7 (0.7)	n.s.	1.1 (0.8)	2.1 (0.8)	n.s.	2.8 (1.1)	1.1 (0.8)	n.s.	2.8 (1.1)	2.1 (0.8)	n.s.

Table 1. Evaluated variables from T0 to T6

PO1.199

Improved and more effective algorithms to screen for nutrient deficiencies after bariatric surgery

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Background: Most bariatric guidelines recommend frequent lab monitoring of patients to detect nutrient and vitamin deficiencies as early as possible. However, the proposed lab tests and the associated cut-off levels, if specified at all, differ. Since cut-off levels for supplementation are not necessarily the same as the lower method-specific reference values, we first defined cut-off values for moderate and severe deficiencies. The corresponding prevalences of nutrient/vitamin deficiencies differed that much that we wondered whether it is necessary to monitor patients always with the full labpanel.

Objectives: The aim of this study was to optimize the cost effectiveness of the nutrient panel, by developing an algorithm, which detects nutrient deficiencies at lower costs.

Materials & Methods: In this retrospective study, all our patients were included who underwent a Laparoscopic Roux-Y Gastric Bypass (LRYGB)

or Laparoscopic Sleeve Gastrectomy (LSG) procedure between 2009 and 2013. In total, 561 (LRYGB) and 831 (LSG) patients had at least pre- and postoperative values of vitamin A, B1, B6, B12, D, folate, ferritin, zinc or magnesium.

Results: The algorithm reduces vitamin D, B12, B6, B1 and ferritin examinations with 15%, 11%, 28%, 28% and 38%, respectively, without missing clinical relevant deficiencies. The corresponding potential cost savings was 14%.

Conclusion: This study identified substantial cost savings in laboratory test for both LRYGB and LSG procedures. The potential cost reduction of 14% might even be increased to 42% when less frequent moderate deficiencies are not screened anymore, while > 99.0 of moderate deficiencies will be detected.

PO1.200

The influence of insulin sensitivity on shbg and androgen levels in premenopausal overweight and obese women

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Background and Aims: Sex hormone-binding globulin is the major binding protein of sex hormones in circulation. Factors that decrease SHBG, increase the free fraction of biologically active androgens. This study investigate the effect of insulin sensitivity on sex hormone-binding globulin (SHBG) and androgens in premenopausal euthyroid overweight and obese women.

Objectives. The significance of SHBG levels in overweight and obese premenopausal women.

Material and Methods. A cross sectional study was done in 100 overweight women (aged 33.2 ± 0.90 yrs) and 36 non-obese women (aged 32.7 ± 0.91 yrs). Patients were divided into 2 groups according their BMI: Group A had BMI < 25 kg/m² (n = 36), and Group B had BMI ≥ 25 kg/m² (n = 100). The median SHBG in Group A was 51,10 nmol/L. Group B was divided into two subgroups: women with higher levels (SHBG $\geq 51,10$ nmol/L) (n = 13) and with lower levels (SHBG < 51,10 nmol/L) (n = 87) of SHBG. All statistical analyses were performed using SPSS 15.0 software. (SPSS Inc.).

Results. The HOMA values are significantly lower and SHBG concentrations higher in Group A (HOMA = 2.73 ± 0.18 vs. 4.75 ± 0.32 , SHBG = 56.18 ± 3.21 vs. 32.75 ± 2.14 , $p < 0.05$). FAI values, triglycerides, fasting glucose, postprandial glucose and insulin are significantly higher in Group B (FAI = 11.12 ± 1.99 vs. 3.85 ± 0.47 , triglycerides = 1.81 ± 0.18 vs. 1.12 ± 0.15 , fasting glucose = 4.95 ± 0.09 vs. 4.53 ± 0.076 , postprandial glucose = 6.73 ± 0.50 vs. 5.15 ± 0.17 , insulin = 60.40 ± 4.16 vs. 41.49 ± 4.81 , $p < 0.05$). HDL are higher in Group A (HDL = 1.44 ± 0.48 vs. 1.26 ± 0.04 , $p < 0.05$). No significant difference was found in mean age between the low and high SHBG groups. In Group B, patients with lower SHBG levels have a significantly higher BM, BMI and waist circumference than patients with higher SHBG (body mass = 100.67 ± 2.21 vs. 87.21 ± 3.32 , BMI = 35.79 ± 0.67 vs. 31.86 ± 1.08 , WC = 0.79 ± 0.01 vs. 0.82 ± 0.01 , $p < 0.05$). HOMA and FAI were significantly higher in low SHBG group (HOMA = 4.67 ± 0.25 vs. 3.65 ± 0.32 , FAI = 12.34 ± 2.11 vs. 2.52 ± 0.38 , $p < 0.05$). Lipid profile, fasting glucose, postprandial glucose and insulin were found similar between two subgroups.

Conclusion. Insulin resistance in obesity decrease SHBG levels leading increasing free androgens in premenopausal women.

PO1.201

Snoring and nocturnal hypoxemia as predictors of insulin resistance in obese patients

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Introduction: Obesity is the main risk factor for obstructive sleep apnea (OSA). Both conditions are known to be associated with metabolic dysregulation. We aimed to explore the impact of OSA on metabolic profile abnormalities in obese subjects attending Padua Bariatric Unit.

Methods: 163 obese subjects with complaints of snoring or excessive daytime sleepiness were recruited retrospectively. These subjects underwent overnight polysomnographic and oral glucose tolerance test (OGTT). In addition, anthropometric parameters, Insulin resistance index (HOMA-IR), lipid profile and inflammatory markers (IL-6, TNF α , hs-CRP, leptin) were assessed. OSA was defined by apnea-hypopnea index (AHI) greater than 5. Glucose intolerance was defined as the presence of either prediabetes or type 2 diabetes.

Results: Results are expressed as median. Our population was divided into 2 groups: OSA group (n = 126 (77.3%); age: 48.2 yrs; BMI: 45.4 kg/m²) and control group with normal polysomnography (n = 37 (22.7%); age 41.3 yrs; BMI 40 kg/m²). The prevalence of glucose intolerance was higher in OSA group compared to controls (65.9% vs. 45.9%; $p < 0.05$). Compared to control group, OSA subjects had higher HOMA-IR (5.3 vs. 2.7; $p < 0.001$), higher LDL-cholesterol (124 mg/dl vs. 105 mg/dl; $p < 0.05$) as well as lower HDL-cholesterol level (45 mg/dl vs. 51 mg/dl; $p < 0.05$). Serum concentrations of inflammatory markers did not exhibit any significant differences between the two groups. In stepwise multivariate regression model in OSA group after controlling for potential confounders, the lowest oxygen saturation (SPO2 nadir) and snoring index had independently accounted for the variance of HOMA-IR.

Conclusion: These findings demonstrate an elevated prevalence of OSA in our Bariatric Unit. Furthermore, the severity of nocturnal hypoxemia and snoring appear to be better predictors for insulin resistance compared with other parameters and therefore their value should not be underestimated when considering obese subjects affected by OSA.

PO1.202

Prevalence of comorbidities in an East London severe complex obesity service

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Introduction: Obese patients suffer from a high burden of comorbidities affecting multiple systems which complicate the issue of weight loss. In our East London trust there is a long running specialist medical service for patients with severe complex obesity, providing a unique cohort in which to study comorbidities. Whilst current literature has quantified the increased prevalence of co-morbidities compared to non-obese groups, little is known about whether this effect continues to exacerbate in more severe obesity since most current studies classify all patients with a BMI ≥ 30 Kg/m² simply as 'obese'. Additionally, we examine the co-effect of socio-demographic variables in the prevalence of comorbidities.

Methods: Data was collected from the records of 367 (of whom 159 had a BMI recorded) patients attending the Barts Health tier 4 obesity service over an 8 month period. Patients were divided into three groups according to severity of obesity (30–40, 40–50 and > 50 Kg/m²). Index of multiple deprivation (IMD) scores were calculated by postcode mapping and corrections for multiple comparisons made using the Bonferroni method. In all comparisons the reference group is 30–40 Kg/m².

Results: Obstructive sleep apnoea, lymphoedema and heart failure were significantly associated with higher BMI groups ($p = < 0.005$, 0.009 and 0.042 respectively). When multiple layer chi square tests were performed

to look for significant associations between higher BMI groups and socio-demographic variables on the prevalence of disease, significant associations were found for Asian ethnicity in Diabetes and Cardiovascular disease, greater deprivation in hypertension and both genders, white ethnicity and older age (>48) in obstructive sleep apnoea (OSA). Multivariate logistic regression (corrected for age, socioeconomic status, gender and ethnicity) found significant associations between increasing BMI and OSA OR 10.4 99%CI (3.33–32.7) and osteoarthritis OR 0.17 (0.036–0.814).

Conclusions: Our data highlights an increased prevalence of OSA, lymphoedema and heart failure in our most obese patients (BMI > 50) compared to an obese (30–40) reference group. We also extend previous findings showing that socioeconomic factors have a significant association with development of co-morbidities with increasing BMI even when compared to an obese reference group.

PO1.203

Obesity and comorbidities – is there any difference in patients with obstructive sleep apnoea syndrome?

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Background: Obesity is one of the major risk factors (RF) for multiple comorbidities, namely diabetes mellitus (DM), hypertension (HTN), dyslipidaemia and obstructive sleep apnoea (OSA). There are transitory hormonal and neurophysiological changes during sleep that can affect the development of several diseases.

Aim: To compare anthropometric and metabolic parameters in obese patients with and without OSA diagnosis.

Methods: Cross-sectional study of obese patients evaluated in our centre who underwent bariatric surgery between January/2010 and July/2014. We evaluated anthropometric, metabolic and polysomnographic data.

Results: A total of 1184 patients were included, 1018 (86%) were female, with a median age of 41years (interquartile range [IQR] 34–51) and median body mass index (BMI) of 43.58kg/m² (IQR 40.57–47.18). Only 213 patients (18%) had a known diagnosis of OSA. The proportion of male patients with OSA was higher when compared with females (40.4%vs.14.3%;p < 0.001). Patients with OSA had a higher median age (50vs.39;p < 0.001), higher proportion of older people (29.5% if 51–60years, 52.2% if 61–70years). Weight (118.0vs.112.8;p = 0.002), BMI (44.33vs.43.44;p = 0.002) and waist circumference (WC) (128vs.121;p < 0.001) were also higher in patients with OSA. Patients with OSA had a higher prevalence of HTN (83.1%vs.62.3%;p < 0.001), DM (55.2%vs.25.8%;p < 0.001) and dyslipidaemia (89.1%vs.77.9%;p < 0.001). Median systolic blood pressure (135vs.130;p = 0.028), diastolic blood pressure (84vs.80;p = 0.032) and the proportion of patients using anti-hypertensive drugs (63.4%vs.33.7%;p < 0.001) were higher in OSA patients, as well as the median fasting glucose (103vs.90;p < 0.001), HbA1c (6.0vs.5.6;p < 0.001) and the proportion of patients using antidiabetic drugs (48.1%vs.20.7%;p < 0.001). Regarding lipid profile, there were statistically significant differences in median HDL cholesterol (46vs.49;p = 0.009) and triglycerides (143vs.121;p < 0.001). Apnoea-hypopnoea index (AHI) was positively correlated with BMI (r = 0.250;p = 0.001), weight (r = 0.384;p < 0.001) and WC (r = 0.360;p < 0.001), but there were no significant correlations with other metabolic parameters.

Conclusion: Only 18% of obese undergoing bariatric surgery had known diagnosis of OSA. These patients were significantly older, had a higher

BMI and more cardiovascular RF (DM, HTN, dyslipidaemia) than those who did not have the diagnosis of OSA.

PO1.204

Illness perception in overweight and obese patients with type 2 diabetes mellitus

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Background and Aims: Most patients with T2DM are overweight or obese, and the global epidemic of obesity largely explains the dramatic increase in the prevalence of T2DM over the past years (1). Prevalence of depressive affect and distress is much higher than the prevalence of any mood disorder in patients with T2DM (2). These subclinical conditions tend to be more persistent over time and are more closely related to diabetes control (3). Subclinical symptoms of depression are also associated with treatment nonadherence and risk of complications and mortality in patients with T2DM (4).

Objectives: The purpose of this research was to investigate the determinants of anxiety and depressive disorders in obese or overweight adults with T2DM.

Materials/Methods: A total of 35 patients (14 women and 21 men) were enrolled in the study, 51% of the subjects were overweight and 49% were obese. Depression and anxiety were assessed using the Hospital Anxiety and Depression Scale (HADS), the Revised Illness Perception Questionnaire (IPQ-R) assessed the five components of the illness representation – identity, consequences, timeline, control/cure and cause in Leventhal's Self-Regulatory Model.

Results: The regression analysis results indicated that the only significant predictor of anxiety in obese and overweight patients with T2DM was the negative consequences of illness representation. The higher level of body weight, disease duration and the negative consequences of the illness are found to be potential risk factors for the development of depressive symptoms in patients with T2DM.

Conclusion: Results of this preliminary study suggest that the cognitive components of patients' representations of illness, especially negative consequences and chronicity, can serve as important predictors in the risk assessment for the development of anxiety and depressive disorders, rather than the objective features of the disease such as disease duration or diabetes control.

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PO1.205

The necessity of preoperative pulmonary function screening in patients scheduled for bariatric surgery

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Background: Obesity is an increasing problem worldwide and since the 1980's the number of people with obesity has doubled. Obesity is known to affect many organ systems under which the respiratory system. Various respiratory physiological parameters are affected, such as compliance, neuromuscular strength, work of breathing and lung volumes. Because of these affected respiratory physiological parameters, obese patients are prone to develop pulmonary complications after bariatric surgery. Therefore the question rises whether we need to perform a preoperative pulmo-

nary function screening in obese patients scheduled for bariatric surgery, to identify the patients prone for postoperative complications.

Objectives: To review the current literature about the necessity of preoperative pulmonary function screening in patients scheduled for bariatric surgery

Results: Four studies reported on pulmonary function preoperatively and its relationship with postoperative complications. Several lung function parameters (FVC, FEV1 and VC) were associated with increased incidence of pulmonary complications.

Conclusion: Based on pathophysiological studies, there is enough evidence that obese patients have an altered pulmonary function and they have a potentially higher risk for developing postoperative pulmonary complications after bariatric surgery. According to current literature, it is questionable whether preoperative pulmonary function and/or OSAS screening is necessary. In our opinion preoperative pulmonary function screening is justified based on available literature. This screening can consist of a combination of non-invasive methods (either the Epworth Sleeping Scale or the STOP-Bang or the Berlin Sleep Evaluation) with a pulmonary function test (in the form of a spirometry and/or respiratory muscle strength and/or polysomnography). However there is increasing need for large sample multicentre studies. These studies are essential to determine clinical utility, cost-effectiveness and to identify specific groups of obese patients that are at risk for developing postoperative pulmonary complications.

PO1.207

Cardiac structure and function before and after bariatric surgery: Implications for clinical practice

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Background: Obesity, defined as a Body Mass Index (BMI) of ≥ 30 kg/m², is the most common chronic metabolic disease worldwide and its prevalence has been strongly increasing. Obesity is associated with various diseases such as metabolic syndrome, cardiovascular disease, type 2 diabetes, hypertension, obstructive sleep apnoea syndrome (OSAS), rheumatoid arthritis and neoplasms. Obesity has physiological effects on several organ systems, like cardiac function. Aim The purpose of this review is to evaluate the cardiac function and structure changes and hemodynamic responses to obesity before and after excessive weight loss. Secondly, to elucidate the possible clinical implications of cardiac remodelling after bariatric surgery for perioperative and anaesthesiological care.

Materials & Methods: Literature review was conducted regarding cardiac structure changes and hemodynamic responses to obesity before and after excessive weight loss and implications for perioperative and anaesthesiological care.

Results: Majority of the studies show beneficial effects on cardiac structure, hemodynamic responses, blood pressure and progression of disease after excessive weight loss. Effects of these cardiac and hemodynamic changes may vary among weight loss profiles and BMI categories. Secondly, There might be a difference in imaging quality between echocardiographic and MRI studies.

Conclusion: Bariatric surgery offers beneficial cardiac effects. These effects might be the result of a combined hemodynamic and metabolic effect of surgical modulation of the enterocardiac axis. Future studies must focus on identifying the most successful bariatric surgical procedure in preventing and treating obesity-related heart disease. Also the long-term changes in cardiovascular parameters after surgery and implications for future anaesthesia and surgery are directions for future research.

PO1.208

Perioperative obesity hypoventilation syndrome: Can a routine preoperative test identify the problem?

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Introduction: Patients with obesity hypoventilation syndrome (OHS) can be at risk of intraoperative and postoperative complications, especially if undiagnosed. Obese patients rarely present to our operating theatres with a diagnosis of known OHS.

Aim: To assess whether a routine serum preoperative HCO₃ level can identify patients with OHS who experience perioperative complications.

Methods: We retrospectively analysed data from surgical patients from our operating theatre suite for a one month period. Patients over the age of 18 years with a known BMI of 30 and over were included. The preoperative serum HCO₃ as well as other demographic and medical information was collected, as was information on postoperative outcomes. This patient group was compared to a group of similar age undergoing similar procedures on the same day if possible with a BMI of under 30.

Results: The incidence of obese patients with a raised preoperative serum HCO₃ was reasonably high, but the rate of documented complications was low.

Conclusion: The rate of undiagnosed preoperative OHS may be higher than currently appreciated. Identification of obese patients with a raised preoperative serum HCO₃ warrants formal testing and follow-up of such patients.

PO1.209

Neck circumference as a useful indicator of obesity in Greek obese population

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Background: Neck circumference (NC) seems to be a good screening tool for identifying obese patients, while handgrip strength test (HST) is a simple and reliable anthropometric method used for nutritional status and body muscle strength.

Objectives: To identify the relation of NC to the relative muscle mass and strength and cardiovascular risk factors in non-diabetic obese patients.

Methods: NC was measured as well as common anthropometric markers of obesity [BMI, waist (WC) and hip (HC) circumference, waist to hip ratio (WHR) and triceps skinfold], muscle mass and strength (handgrip, arm circumference, midarm (MAMC) muscle circumference), cholesterol, blood pressure and cardiovascular risk according to Framingham risk score (FRS) in 55 non-diabetic obese Caucasian outpatients in the 1st COM in Greece.

Results: Mean neck circumference was 44.3 ± 2.9 cm for men (N = 15) and 37.5 ± 2.9 cm for women (N = 40). Mean BMI was 38.5 ± 6.2 kg/m² and mean age was 51.5 ± 9.8 years. All patients were non diabetic and the majority (85%) non-smokers. Furthermore, 73% (N = 40) were placed in the low risk category and only 1 in the high risk, according to FRS. There was a significant ($p < 0.001$) positive correlation between NC and body weight ($\rho = 0.553$), WC ($\rho = 0.588$), WHR ($\rho = 0.661$), height ($r = 0.592$) and an inverse association to HDL ($\rho = -0.547$), while BMI, HC, triceps skinfold and arterial blood pressure (SBP or DBP) did not have any statistically significant association with NC. NC was also positively associated to muscle mass markers like arm circumference ($r = 0.416$, $p < 0.005$), MAMC ($\rho = 0.540$, $p < 0.001$), and HST in right and left side ($\rho = 0.415$ and $\rho = 0.356$ respectively, $p < 0.05$). Nevertheless, there was no statistical association between FRS and NC in either the total sample or in each sex separately.

Conclusion: Neck circumference may be a reliable, cheap and easy to perform screening marker for assessing obesity in everyday clinical practice, especially when patients are at low risk according to FRC.

PO1.210

Perioperative respiratory care in obese patients undergoing bariatric surgery: Implications for clinical practice

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Background: Obesity is an increasing problem worldwide. The number of people with obesity doubled since the 1980's to affect an estimated 671 million people worldwide. Obese patients in general have an altered respiratory physiology and can have an impaired lung function, which leads to an increased risk of developing pulmonary complications during anaesthesia and after bariatric surgery (approximately 8%). Therefore the respiratory management of the bariatric surgical patient provides a number of challenges. Aim This review will focus on the perioperative respiratory care in bariatric surgical patients discussing respiratory physiology in the obese and perioperative respiratory care in bariatric surgery. Finally the value of preoperative pulmonary function testing and preoperative OSAS screening will be discussed.

Materials & Methods: A literature review was performed regarding perioperative respiratory care in bariatric surgical patients

Results: The majority of the obese patients have an altered respiratory physiology and have an impaired lung function, which leads to an increased risk of developing pulmonary complications during anaesthesia and after bariatric surgery. Therefore the respiratory management of the bariatric surgical patient is challenging.

Conclusion: There is growing evidence in particular around optimal ventilation strategies to minimize the risk of postoperative complications. Whether patients scheduled for bariatric surgery need to be screened for obesity related pulmonary function impairment (and OHS/OSAS) is still subject to discussion.

PO1.211

Weight loss effect induced by intragastric balloon related to dietary guidelines in patients with hepatic steatosis

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ABC Medical School

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PO1.212

Management of morbid obesity after baryatric surgery – case presentation

Iftene, M.

Individual Practice " CMI Dr.Mihaela Iftene"

Bariatric surgery is a therapeutic option for the patient with morbid obesity. In this presentation we discuss the therapeutic options we have for patients how gain weight after this interventions, to prevent complications or to treat complications this patient already have. Cardiac complications, dermatologic complications, diabetes, surgical interventions can complicate therapeutic options.

PO1.213

The Adolescent Morbid Obesity Surgery (AMOS) study: Five-year outcomes following laparoscopic Roux-en-Y gastric bypass in a Swedish nationwide study

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Background: AMOS is a prospective, non-randomized controlled nationwide study, comparing laparoscopic gastric bypass (LRYGB) with medical intervention program for adolescents with severe obesity.

Methods: Eighty-one adolescents (mean 16.5 years; min-max 13–19) underwent LRYGB (surgery group), centralized to a single unit, with 5-year follow-up. Weight inclusion criteria were BMI ≥ 40 , or $\geq 35\text{kg/m}^2$ with comorbidities. Eighty adolescents, matched for age (± 2 months) and BMI, were identified from a national registry and prospectively followed as a control group.

Results: Weight: Across 5 years, mean weight and BMI in the surgery group decreased from 132.8 to 96.0kg and 45.5 to 32.3kg/m², respectively. Control subjects' weight increased from 122.6 to 135.3kg, and BMI from 41.9 to 45.3kg/m². This corresponded to -27.7% vs. +10.4% weight changes ($p < 0.0001$) and -28.8% vs. +8.1% BMI changes ($p < 0.0001$), respectively. Cardiovascular risk: LDL cholesterol decreased after surgery, while increasing in the control group (mean difference [MD] -0.47 vs. +0.25mmol/L, $p < 0.0001$). Triglyceride levels decreased after surgery, while remaining unchanged in controls (MD -0.23 vs. -0.01mmol/L, $p = 0.463$). HDL cholesterol changes were +0.25 (surgery) and -0.47mmol/L (control, $p < 0.0001$). Glucose homeostasis: Changes favored the surgical group regarding plasma insulin (MD -20.5 vs. -10.0mU/L, $p = 0.050$) and glycated hemoglobin (HbA1c) (MD -1.1 vs. +3.4%, $p = 0.035$). However, paired samples at 1 and 5 years were available from 21 (insulin) and 13 (HbA1c) control patients. Inflammation: High-sensitivity C-reactive protein levels reduced from 7.27 to 1.83mg/L in the surgery group, remaining unchanged (8.66 to 8.65mg/L) in the control group (MD -5.44 vs. -0.02mg/L, $p = 0.005$). Paired samples were available from 16 control patients. Adverse events: Fifteen (18.8%) laparoscopic remedial operations were performed, indications including internal hernia and symptomatic gallstone disease. Crossover: Eighteen control patients (22.5%) underwent surgery (LRYGB) within 5 years of follow-up, owing to perceived treatment failure after having reached standard surgical eligibility (age ≥ 18 years).

Conclusion: Compared with conservative treatment, LRYGB was associated with substantial weight loss and sustained improvement in metabolic risk factors. Almost 1 in 7 operated adolescents needed a remedial surgical procedure. More than 1 in 5 conservatively treated adolescents underwent bariatric surgery within the 5-year follow-up.

PO1.214

Development of a culturally adapted weight management programme for children from Pakistani and Bangladeshi communities in the UK: The CHANGE Study

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Background & Aims: First Steps is a child weight management programme run in Birmingham (UK) aiming to change behavioural habits of

families with overweight children. In England, 34% of 10–11 year olds are overweight/obese, with higher prevalence amongst South Asian children compared to white children (23% vs. 18%). South Asians are also more vulnerable to the cardiometabolic consequences of obesity in childhood and adulthood. First Steps has lower than average completion rates amongst Bangladeshi and Pakistani (BP) families. The aim of the CHANGE study (Child weight mANaGement for Ethnically diverse communities) is to culturally adapt the First Steps programme so that BP families are more likely to engage with and complete the programme.

Objective: To culturally adapt the First Steps programme to better suit BP families, using (i) the Behaviour Change Wheel(1) and (ii) Typology of cultural adaptation of health promotion programmes(2) to guide adaptation.

Material/Methods: Interviews with BP parents who had experienced the First Steps programme were undertaken. Resulting data were used identify changes that needed to be made to improve three behavioural targets: programme attendance, physical activity and healthy eating. These changes were categorised into capability, opportunity and motivation (COM-B) and intervention functions to include in the adapted course were identified. In parallel, the interview data were mapped to the Typology of cultural adaptation and the intervention components requiring adaptation were identified. Detailed programme planning was then undertaken.

Results: The developed 6-week intervention focuses on encouraging social support within the groups. Parents and children attend the programme. Interactivity and tailoring to meet individual needs of the families are key components. Preliminary data suggests that 68% of participants are completing the adapted programme, compared with 50% completion of the original programme.

Conclusion: A theoretically informed programme has been developed that can be flexibly delivered to meet the requirements of families from diverse cultures.

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PO1.215

Adiposity phenotypes in adolescents and incidence of adult metabolic syndrome: Tehran Lipid and Glucose Study

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Background & Aim: Obesity phenotypes can be regarded as an indicator of interaction between body mass index (BMI) and cardiovascular disease risk factors. The current study determined the prevalence of adiposity phenotypes among 10–18-year-old adolescents, and investigated the role of adiposity phenotypes in prediction of adult MetS, independent of adult BMI.

Material/Methods: For this population-based cohort study, 2159 adolescents aged 11–18 years, who participated in the framework of the Tehran Lipid and Glucose Study were included. Subjects were divided into four obesity phenotype groups: metabolically healthy normal weight (MHNW), metabolically healthy obese (MHO), metabolically unhealthy normal weight (MUNW), and metabolically unhealthy obese (MUO). Cox proportional hazard modeling was used to estimate hazard ratios (HRs) along with 95% CIs for incidence of adult MetS after a median follow-up of 11.3 years.

Results: The prevalence of adiposity phenotypes at baseline was 56.1, 8.2, 21.4, and 14.3% for MHNW, MHO, MUNW, and MUO, respectively. To-

tal incident rate of MetS in early adulthood was 2096 (95% CI: 1879–2339) per 10000 person-years with higher rates in boys [30418 (95% CI: 3051–3817)] compared to girls [841 (95% CI: 648–1090)]. In unadjusted model, the risk of developing adult MetS was highest in MUO, followed by MHO, and MUNW adolescents compared to MHNW. In age- and BMI-adjusted model, the risk of adult MetS was among MUO boys followed up more than 6 years (HR = 3.33; 95% CI: 2.08–5.32), MHO (HR = 1.71; 95% CI: 1.01–2.90), and MUNW (HR = 2.52; 95% CI: 1.72–3.68) boys; however, all associations were attenuated in girls.

Conclusions: It seems that all adiposity phenotypes in boys but not in girls may predict adult MetS; however, those with MUNW phenotype are at higher risk of adult MetS. References: Hosseini et al. Adolescence metabolic syndrome or adiposity and early adult metabolic syndrome. J Pediatr 2013; 163(6):1663–1669.

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PO1.216

Lifestyle habits differ across gender and age in treatment seeking adolescents with severe obesity

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Background: and Aim: The literature is scarce about possible differences in lifestyle habits among male and female adolescents with severe obesity. Increased knowledge about this topic may facilitate individualized treatment.

Objectives: The objectives were to assess whether physical activity level, screen time and breakfast habits demonstrated possible gender- and age specific patterns in treatment seeking adolescents with severe obesity.

Material/Methods: A total of 288 consecutive adolescents (144 girls), aged 12–17 years, attending a tertiary care obesity centre in Norway agreed to participate in the Vestfold Childhood Obesity Registry and completed a semi-quantitative questionnaire about physical activity, screen time and breakfast eating. Time spent on exercise; “low” (≤ 3 times/month) or “moderate to high” (1–7 times/week), watching TV/using the computer; “low to moderate” (< 4 hours/day) or “high” (≥ 4 hours/day), and the frequency of eating breakfast; “rarely” (≤ 2 times/week), “sometimes” (3–5 times/week) or “regularly” (6–7 times/week), were registered.

Results: The boys and girls had mean(SD) age, weight and BMI of 14.6(1.7) vs. 15.3(1.6) years, 112.0(24.5) vs. 107.5(19.8) kg, and 38.0(5.9) vs. 39.4(6.1) kg/m², respectively. A moderate to high physical activity level was reported more frequently by younger (12–14 years) than older (15–17 years) adolescents, 71% vs. 59%, $p = 0.04$, whilst physical activity level did not differ significantly between genders, $p = 0.36$. A larger proportion of boys than girls reported high screen time, 61% vs. 48%, $p = 0.03$, and older adolescents reported more frequently high screen time compared with the younger, 61% vs. 47%, $p = 0.02$. A higher proportion of the older girls reported high screen time compared with younger girls, 56% vs. 35%, $p = 0.02$. Finally, more boys than girls reported eating breakfast regularly, 64% vs. 49%, $p = 0.04$, whilst breakfast habits did not differ significantly between younger and older adolescents.

Conclusion: These results demonstrate different physical activity levels, screen times and meal patterns among treatment seeking adolescents with severe obesity across age and gender. Our findings may facilitate future individualized treatment of adolescents with severe obesity, but need verification in future studies.

Obesity treatment with intragastric balloon in an adolescent: Case series

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Introduction: Obesity in children has become a critical health problem throughout the world, increasing the appearance of comorbidities found commonly in adulthood. About 25 percent of children 2–5 years in the United States and England are overweight or obese. In adults with BMI greater than 27 kg/m², the treatment of obesity with intragastric balloon (IB) has proven successful, with improvement of anthropometric parameters, liver function markers, fatty liver, blood sugar levels and resistance insulin. One study, using IB in children and adolescents, showed favorable results in weight loss after three months. In addition to the significant decrease in anthropometric parameters.

Objective: Evaluate the efficacy and safety of treating obesity with intragastric balloon in 10 obese adolescents.

Results: The median age was 15 years and the time from menarche 2 years. There was a reduction in weight of 11.1 kg (IQ: -15.5; -7.5); in BMI of 2.9 (IQ: -4.4, -1.6) and ZIMC 0.4 (-0.8, -0.3) in this period. The percentage of weight loss at 6 months correlated with the loss at 7 (r = 0.755; p = 0.031), 14 (r = 0.786; p = 0.021) and 90 days (r = 0.922; p = 0.001). About laboratory tests, initial and 6 months after placement of the balloon, there was no difference in relation to the lipid profile. However, the concentrations of insulin and HOMA-IR were lower after treatment.

Conclusion: IB showed a positive effect to significantly reduce body weight in obese children, especially within the first 3 months. A significant improvement in BMI, waist circumference and percent excess weight loss. IB also had a positive effect on the major components of metabolic syndrome, in particular an improvement in insulin level, HOMA index and fasting plasma glucose concentration.

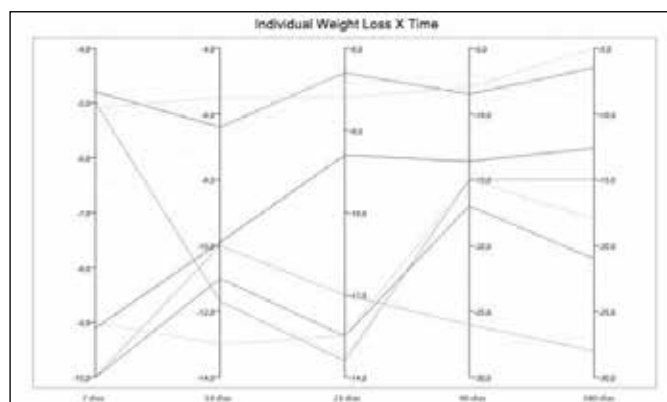


Fig. 1. Individual Weight Loss

School-aged children in Bulgaria spend 26 hours weekly on screen time. Data from the EPHE study

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Introduction: Socioeconomic inequalities are strong determinant in obesity prevalence. Thus, the EPHE project analyses the added value of the EPODE methodology to reduce socioeconomic inequalities in diet and physical activity behaviors of families in 7 European communities.

Methods: School-aged children (6–8 years) and their families from different socioeconomic backgrounds were recruited in the 2-year follow-up study. Seven community-based programmes participated in the EPHE project: VISIANO (Belgium), HEALTHY KIDS (Bulgaria), PAIDEI-

ATROFI (Greece), Maia Healthy Menu (Portugal), SETS (Romania), JOGG (The Netherlands). Each programme aimed to recruit minimum 150 families (children and their parents) in a selected community differing by mother's educational level (low vs. high). In order to identify inequalities and socioeconomic differences in energy-balance related behaviors and their determinants, a self-administrated parental questionnaire was distributed between May/June 2014 (T1) and May/June 2015 (T2).

Results: Changes in behaviors after one year intervention within the low and high educational group were observed. The frequency of fruit intake increased significantly within the Dutch low educational group, reaching the level of the high educational group. For the determinants of soft drinks the results were mixed. Another notable finding was the decreased TV time during week days among the participants of the Belgian low education group. Moreover computer time both during weekdays and during weekend days increased significantly within the Bulgarian high education group, resulting in higher screen exposure during the week.

Conclusion: The improvements in behaviors and determinants among school-aged children in high and low socioeconomic status show that the inequalities in energy-balance behaviors could be modified to reduce the obesity prevalence. EPHE project is supported by the European Commission.

Childhood obesity and serious video games: Challenging the family resistance

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Childhood obesity is an important problem in the domain of health care. Its consequences are serious: cardio-vascular disease; diabetes; arthrosis etc. (OMS, 2012). Taking care of an obese or overweight child needs the involvement of the whole family in the weight stabilization process. The aim of the « KeepHealthyKids » study was to understand how we could intervene in accompanying childhood obesity through serious video games and mobile applications. We conducted a psychological support study in order to understand how to deal with obese or overweight children and their family using serious video game as a tool for management of the weight stabilization.

Method: we used a "double" methodology assembling the retrospective and prospective data issue from medical files and clinical interviews. Sample: children from 7 to 10 years old and their parent(s), both accompanied by obesity care centers; 69 medical files were analyzed; 19 clinical interviews were provided, recorded, transcribed and analyzed. Instruments: We performed specialized database analysis using Sphinx software for medical files. Clinical interviews were based on semi-headed interviews and projective tests (children drawings and Rorschach test).

Results: Only 16.2% of children demanded to change their weight; 46.2%

Table 1. Representative table of biomarkers at the beginning and the end of treatment of 10 adolescents studied

	Initial	After 6 months	p
Total Cholesterol (mg/dL)	182.5 (170.7; 217.1)	182.5 (155.0; 201.5)	0.359
HDL-c (mg/dL)	43.5 (39.2; 55.5)	45.5 (37.5; 55.0)	0.443
LDL-c (mg/dL)	118.7 (111.0; 142.0)	118.0 (93.2; 129.7)	0.109
Triglycerides (mg/dL)	100.0 (46.7; 231.0)	89.0 (56.2; 160.5)	0.646
Glycemia (mg/dL)	82.5 (77.2; 93.5)	75.7 (69.5; 86.0)	0.139
Insulin (uU/mL)	16.6 (9.2; 93.5)	8.7 (5.7; 12.3)	0.005
%glycated hemoglobin	5.4 (5.0; 5.6)	5.4 (5.1; 5.7)	0.473
HOMA-IR	3.4 (1.8; 5.8)	1.4 (0.9; 2.4)	0.008
TGP (U/L)	20.5 (15.0; 41.2)	22.5 (17.5; 27.7)	0.284
Gama-GT (U/L)	19.0 (13.0; 33.0)	23.0 (15.7; 52.7)	0.139

had a rather positive body image; 28.1% had a very positive body image.

The oedipal structure seemed quite fragile. Parents often avoided taking the responsibility of modifying their habits asking children to change their behavior without changing the family lifestyle. We noticed that the overweight of the child could “support” some others unconsciousness conflicts.

Discussion: Kids are forced to become aware of their overweight by others, by themselves they feel good. The intervention by video game must provide fun without pointing out the body changes and must overcome the family resistance against the change of their lifestyle in the process of the kid's weight management.

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PO1.220

Nonalcoholic fatty liver disease in children

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Nonalcoholic fatty liver disease (NAFLD) is the most common cause of chronic liver disease in children and adolescents. In obese children, NAFLD is associated with features of the metabolic syndrome and can lead to liver inflammation, fibrosis and even cirrhosis. The aim of this study was to identify the prevalence of NAFLD in obese children.

Material/Methods: The authors performed a retrospective study, based on the analysis of clinical observation sheets of 306 patients (157 boys, 149 girls) aged between 6 and 18 years old (average age 11,7), diagnosed with obesity in the III rd Clinic of Pediatrics of Iasi, Romania between the 1st of January 2010 and the 1st of January 2013. Anthropometric examination (weight, height, waist circumference, body mass index), blood pressures, liver aminotransferase levels, glucose and lipid profile were all assessed. Diagnosis criteria for NAFLD were: diffusely hyperechogenic liver at ultrasonography, persistently elevated aspartate transaminase (AST) or alanine transaminase (ALT) (> 35 UI for at least 6 month) after exclusion of viral, cholestatic and genetic causes of liver disease.

Results: 28 patients with obesity were diagnosed with NAFLD. All patients presented were elevated the serum aminotransferases and abnormal hepatic ultrasonography. Of those, 4 patients presented hepatomegaly at clinical exam, 6 of them also suffering of impaired glucose tolerance. Serum lipid profiles were changed in 14 patients who had hypercholesterolemia and 8 who had hypertriglyceridemia. Analyzing the food intake, we observed a positive correlation between the visceral obesity and lipid consumption in patients with NAFLD. Treatment was based on dietary measures and physical activity, associated with ursodeoxycolic acid administration.

Conclusions: Obesity has emerged as a significant new health problem in the pediatric population. Strategies should focus on early detection and adequate management of obesity, especially in children with associated risk factors in order to prevent NAFLD as quickly as possible.

PO1.221

Changes in serum SPARC, MMP-2, and -9 concentrations after bariatric surgery in obese adults

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Purpose: Remodeling of the extracellular matrix (ECM) of adipose tissue is regarded as part of the pathophysiology of obesity. Secreted protein acidic and rich in cysteine (SPARC) was the first ECM protein described

in adipose tissue. Matrix metalloproteinases (MMPs) also play a role in ECM remodeling, and MMP-2 and -9 may be associated with abnormal ECM metabolism. Here, we investigate changes in serum SPARC, MMP-2, and -9 concentrations after bariatric surgery in obese adults.

Materials/Methods: We recruited 34 obese patients who were scheduled to undergo bariatric surgery for weight loss. We analyzed changes in serum SPARC, MMP-2, and -9 concentrations before and 9 months after bariatric surgery and any associations between changes in SPARC, MMP-2, and -9 concentrations and obesity-related parameters.

Results: Serum leptin levels significantly decreased, and the serum adiponectin level significantly increased after bariatric surgery. The serum SPARC concentration decreased significantly from 165.0 ± 18.2 ng/mL to 68.7 ± 6.7 ng/mL ($p < 0.001$), and the MMP-2 concentration also decreased significantly from 262.2 ± 15.2 ng/mL to 235.9 ± 10.5 ng/mL ($p < 0.001$). Changes in the serum SPARC concentration were significantly correlated with HOMA-IR changes, and changes in the serum MMP-9 concentration were found to inversely correlate with serum adiponectin changes.

Conclusion: These findings show that significant decreases in serum SPARC and MMP-2 concentrations occur after bariatric surgery. Our results thus suggest that weight loss via bariatric surgery could alter the ECM environment, and that these changes are related to certain metabolic changes.

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PO1.222

Relationship between body weight change, TSH levels and levothyroxin dosage in patients with thyroid disease undergoing bariatric surgery: Gastric bypass vs sleeve gastrectomy

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Background: Some evidence indicates how bariatric surgery determines in euthyroid patients a decrease in TSH and in hypothyroid non treated patients a normalization of TSH levels. It been also suggested that bariatric surgery, could affect the absorption of the drug levothyroxine (LT4). However, the literature evidences are not univocal.

Aim: To examine the relationship between change in body weight, plasma levels of TSH and dosage of LT4 in patients with thyroid disease undergoing bariatric surgery and to compare the effects of sleeve gastrectomy (SG) vs Roux-en-Y gastric bypass (GB).

Methods: Retrospective study of patients underwent bariatric surgery. The data was collected from medical records of hospitalization (presurgery data of 87 patients) and from outpatient medical records at the visit of 45 days, 3–6 months and 1 year after surgery (43 post-surgical patients of which were available all three follow-up visits: 31 in LT4 therapy 16 GB (Tr-GB) and 15 SG (Tr-SG); 12 patients as control with normal thyroid function, 6 GB (Ct-GB) and 6 SG (Ct-SG)).

Results: All groups showed a similar body weight reduction (48%). In Ct-SG and Ct-GB TSH levels remained stable throughout the observation period, without differences for type of surgery and without relationship with body weight. In Tr-GB at 45 days, it was observed a not significant increase of TSH, despite the corresponding increase in the dosage of LT4. In Tr-SG, TSH levels were reduced compared to presurgery ($p = 0.02$) and was lower than Ct ($p < 0.001$). In Tr-SG, but not in Tr-GB and Ct, fT3 levels were reduced 1 year after surgery compared to presurgery ($p = 0.008$). From simple regression analysis in Tr-SG, but not in Tr-GB, body weight

was directly associated with dose of LT4 (Tr-SG: $r_2 = 0.30$, $p < 0.001$; Tr-GB: $p = \text{ns}$).

Conclusions: under conditions of normal thyroid function, TSH levels are not related with body weight change. In patients treated with LT4 the dosage of the drug is related to body weight after SG but not after GB, to suggest a reduced absorption of levothyroxine in patients undergoing surgery with malabsorptive component compared to restrictive surgery. The results should be confirmed on a larger sample.

PO1.223

Bariatric surgery and gout- a Swedish Obese Subjects study

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Background and Aims: Hyperuricemia and gout are a burden for Western countries¹. Weight loss is recommended to lower serum urate levels and prevent gout development². Bariatric surgery is the most effective treatment to achieve weight loss and improvement in obesity-related comorbidities^{3,4}. We aim to study the effect of bariatric surgery on the incidence of gout and hyperuricemia in obese subjects.

Material and Methods: The Swedish Obese Subjects (SOS) study is a prospective controlled intervention trial designed to assess the effect of bariatric surgery on obesity-associated morbidity and mortality compared to conventional treatment. All subjects without gout diagnosis at baseline have been included ($n = 1,982$ subjects from the bariatric surgery group and 1,999 controls). Endpoint on gout incidence was created based on information on gout diagnosis and gout medications through national registers and questionnaires. Hyperuricemia was defined as serum urate levels ≥ 6.8 mg/dl.

Results: Bariatric surgery was associated with a reduced incidence of gout compared to control group (adjusted hazard ratio 0.60, 95% confidence interval 0.48–0.75, p value < 0.001). The effect of bariatric surgery on gout incidence was not influenced by baseline risk factors. During follow-up the surgery group had a lower incidence of hyperuricemia (adjusted hazard ratio 0.47, 95% confidence interval 0.39–0.57, p value < 0.001).

Conclusions: This is the first study showing that bariatric surgery is effective in preventing the incidence of gout and hyperuricemia in a large cohort of obese subjects with a long-term follow up.

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PO1.224

Costs and outcomes of increasing access to bariatric surgery for obesity: Cohort study and cost-effectiveness analysis using electronic health records

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Objectives: This study aimed to evaluate the costs and outcomes of increasing access to bariatric surgery (BS) for severe and morbid obesity. Design and

Methods: Primary care electronic health records (EHRs) from the UK Clinical Practice Research Datalink (CPRD) were analysed for participants who received BS and general population controls. The cost-effectiveness of BS was evaluated in severe and morbid obesity through a probabilistic Markov model populated with empirical EHR data.

Results: In a cohort of 3,045 adult obese patients with first BS procedures between 2002 and 2014, rates were greatest among those aged 35–54, with a peak of 37 procedures per 100,000 population per year in women and 10 per 100,000 per year in men. During a maximum of 7 years of follow-up, incidence of diabetes diagnosis was 28.2 (95%CI 24.4–32.7) per 1,000 person-years in controls and 5.7 (4.2–7.8) per 1000 in BS patients (adjusted hazard ratio 0.20, 95%CI 0.13–0.30, $p < 0.0001$). There were 826 obese participants with T2DM who received BS. The relative rate of diabetes remission, compared to controls, was 5.97 (4.86 to 7.33, $P < 0.001$). Before surgery, 36% of BS participants, and 21% of controls, had clinical depression. There was a slight reduction in depression in the first three years following BS that was not maintained. Incremental lifetime costs associated with BS were £15,258 (£15,184 to £15,330), including costs associated with bariatric surgical procedures of £9,164 per participant. Incremental QALYs were 2.142 (2.031 to 2.256) per participant. The estimated cost per QALY gained was £7,129 (£6,775 to £7,506). Estimates were similar across gender, age and deprivation subgroups. BS was slightly more cost-effective in patients with diabetes and slightly less cost-effective in severe obesity.

Conclusions: BS is associated with increased health-care costs but these are outweighed by expected health benefits to obese individuals with reduced onset of new diabetes, remission of existing diabetes and lower mortality. A wide range of obese individuals have capacity to benefit from BS at acceptable cost.

PO1.225

MRI-fat quantification of the liver, subcutaneous and visceral fatty tissue in patients before and after bariatric surgery

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Background & Aims: In morbid obesity, fatty liver is a common finding and can lead to steatohepatitis and liver cirrhosis. The effect of bariatric surgery on fat distribution in the liver has so far been studied with liver biopsies and single voxel MR techniques. In this study, body fat content and distribution was monitored using MRI in combination with biomarker analysis before and after bariatric surgery.

Objective: Non-invasive assessment of liver fat fraction (LFF), subcutaneous (SAT) and visceral adipose tissue (VAT) using MRI in combination with plasma biomarkers to monitor the efficiency of bariatric surgery.

Material/Methods: In 11 morbidly obese patients an iterative decomposition of water and fat with echo asymmetry and least-squares estimation (IDEAL) approach was used for whole liver fat quantification in combination with a 2-point Dixon technique for volumetric fat imaging of adipose tissue pre- and 3, 6, and 12 months after surgery. Plasma L-FABP, M30 and Fetuin A were measured in patients and in 12 lean controls. SAT and VAT adipose tissue volumes were assessed from fat images and separated by statistical shape models.

Results: L-FABP and M30 decreased postoperatively numerically, no statistical significance could be reached. L-FABP was significantly higher in preoperative patients vs. lean controls. Fetuin A yielded no usable results. LFF, SAT and VAT volumes decreased postoperatively with a good phenomenological description using an exponential model of form $A \cdot (LFF, VAT, SAT)(t) \sim \exp(-t/T_{(LFF, VAT, SAT)})$, where t is the time (in days) after intervention, $A = [A_1, A_2, \dots, A_{11}]$ refers to the individual patient

specific LFF, SAT or VAT volumes, in combination with a global time constant TLFF,VAT,SAT for each measure. The LFF reduced the fastest, (time constant: TLFF = 96 ± 28 days), followed by SAT (TSAT = 140 ± 18 days), and VAT (TVAT = 170 ± 21 days). Correlation of the MRI measures with any of the biomarkers was not successful.

Conclusions: 1) Decrease of liver fat, subcutaneous and visceral fat after bariatric surgery follows a distinct time pattern: liver fat decreases fastest followed by subcutaneous and last visceral fat, 2) correlation with biomarkers of liver apoptosis were not successful.

PO1.226

Laparoscopic revision for weight loss failure after Roux-en-Y Gastric Bypass using a modified distalisation technique

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Background & Aims: Despite laparoscopic Roux-en-Y gastric bypass (LRYGB) is considered as the gold standard for the treatment of obesity and related co-morbidities, a significant number of patients suffer from either weight regain or weight-loss failure, with reoperation rates of 2.1–20%. Conversion from a standard LRYGB to a malabsorptive distal LRYGB is one option among several revisional procedures. Despite a significant weight loss it can lead to serious adverse events.

Objectives: There is no general consensus about the optimal limb lengths in the distal LRYGB and it is usually a matter of individual practice. In the present study, we describe our personal technique and our first results.

Material/Methods: From 2013 to 2015, 11 patients (5M/6F) with mean BMI 40.6 (37–46) required conversion from primary standard LRYGB to distal LRYGB, either for failure of weight loss ($n = 8$) or for weight regain ($n = 3$). After measuring the total small bowel length, we adopted the following configuration: common limb length of 100 cm, Roux limb of 2/3 and bilio-pancreatic limb of 1/3 of the rest of the bowel. Roux limb length was minimum 300 cm. The aim was to increase malabsorption while avoiding malnutrition.

Results: Operating time ranged from approximately 150 to 180 min and the mean hospital stay was 3.9 days (3–5). We had only one late postoperative complication, a bleeding in the Y-anastomosis, which occurred 5 days after the operation and stopped spontaneously after stopping the low molecular weight heparin prophylaxis. The mean excess BMI loss in patients with follow-up > 12 months (5 patients) was 54.68% if we consider the BMI before distalization and 63.86% if we consider the BMI before primary bypass. One patient had significant protein and vitamin deficiencies and one patient had significant diarrheas.

Conclusion: Laparoscopic conversion of failed LRYGB to a distal one, using a modified technique, seems to be feasible, safe and effective. Nevertheless, this technique requires greater surgical skills and experience, as well as a great compliance of patients for follow-up because possible adverse events may offset the benefits of sustained weight loss in the long term.

PO1.227

Conversion to diabetes during 5 years, following three bariatric surgeries, in obese pre-diabetic individuals

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Background: The DPP study demonstrated conversion from prediabetes to diabetes after 2.8 years of 11%, 7.8% and 4.5% with lifestyle modification, metformin treatment and placebo, respectively. The SOS study showed bariatric surgery to be more effective than usual care; an associ-

ation was observed with impaired fasting glucose but not with baseline BMI.

Objective: To compare in prediabetic obese individuals, long-term rates of conversion to diabetes following three bariatric surgeries: roux en-Y gastric bypass (RYGB), gastric band (GB) and sleeve gastrectomy (SG).

Materials/Methods: Electronic data on bariatric surgeries performed during 2002–2011 in Clalit Health Services (CHS), a large nationwide healthcare organization, were accessed until December 2015. Prediabetes was defined as fasting blood glucose (FBG) 100–125 mg% or HbA1c 5.7%–6.4% in the year pre-surgery.

Results: Of 13,099 bariatric operations, 1,756 (13.4%) were performed in prediabetic patients: 819 GB, 845 SG and 92 RYGB; 73.5% were women. Mean age was 41.6 ± 11.74 years. Mean BMI \pm SD at baseline, 2 years post-operative and 5 years postoperative were 43.4 ± 5.51 , 34.6 ± 6.19 and 35.2 ± 6.63 for GB; 43.5 ± 5.67 , 33.3 ± 5.89 and 34.9 ± 6.63 for SG; 43.6 ± 6.22 , 32.3 ± 5.99 and 33.3 ± 6.54 for RYGB. Respective Mean FBG (mg%) \pm SD were 108.3 ± 16.35 , 95.6 ± 15.3 and 101.1 ± 27.19 for GB; 105.4 ± 14.02 , 88.8 ± 10.2 and 89.4 ± 10.31 for SG; 101.3 ± 12.43 , 87.4 ± 10.73 and 89.34 ± 11.61 for RYGB. Respective Mean HbA1c \pm SD were 5.9 ± 0.344 , 5.7 ± 0.67 and 5.9 ± 0.78 for GB; 5.9 ± 0.31 , 5.7 ± 0.61 and 5.7 ± 0.55 for SG; 5.9 ± 0.23 , 5.6 ± 0.57 and 5.8 ± 0.44 for RYGB. At 1, 2 and 5 years follow-up, rates of diabetes development were 2.1%, 6.6% and 12.2% for GB; 1.1%, 2.8% and 4.4% for SG; 1.1%, 2.2% and 3.3% for RYGB. In a multiple logistic regression model, predictors of diabetes development were baseline age, degree of change in BMI, high baseline FBG, particularly when presenting with high baseline HbA1c. Baseline BMI did not predict conversion to diabetes. GB showed 2.68 times greater risk than SG for conversion to diabetes.

Conclusion: Bariatric surgery, and particularly RYGB and SG, demonstrated low conversion to diabetes in obese pre-diabetic individuals, at five year follow-up.

PO1.228

Long and narrow gastric pouch in laparoscopic proximal gastric bypass: Effect on weight loss and dumping syndrome

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Review: Laparoscopic proximal gastric bypass has been regarded for a long time as the gold standard treatment for morbid obesity and its co-morbidities. With the presence of the newer strong options, like the gastric sleeve and the mini gastric bypass, refinement of the technique are taking place to avoid its current problems. Early and delayed gastric dumping are known problems after proximal gastric bypass, an area where dietary adjustment was the commonly feasible solution. Modifications in the technique by providing the patient with a long narrow pouch might help the problem by slowing the gastric emptying time, should it keeps the weight loss in an acceptable range.

Aim: The aim of this study is to evaluate whether constructing a long and narrow pouch can decrease the incidence of early and late dumping after laparoscopic proximal gastric bypass and to evaluate its impact on the weight loss rates.

Patients and Methods: In this prospective study, 42 morbidly obese patients with average BMI of 44 kg/m^2 were recruited. All recieved standardized long narrow pouch of 8 cm length created over 36 Fr pougy. The 3, 6, 9 and 12 months follow up data regarding their % weight loss in addition to a questionnaire for early and delayed dumping symptoms existence and severity were collected. The data were compared to our records of a previous larger (112 patients) study on globular 35 ml pouches in which similar data were collected.

Results: Percentage Weight loss after 3, 6, 9 and 12 months were 13, 24, 47 and 62% respectively. The weight loss data showed no statistically difference from the compared group. Early dumping symptoms were recorded in 12.6% of the studied group with 83.3% recorded the symptoms as mild. Late dumping symptoms were recorded in 8% of the studies group, all of

them recorded mild symptoms. The dumping rates were significantly less on comparison for the early symptoms but not the delayed symptoms.

Conclusion: Performing long and narrow pouches during laparoscopic proximal gastric bypass may help reducing the incidence of early dumping with acceptable weight loss rates.

PO1.229

Sleeve gastrectomy in patients over 60 years: A single center experience

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Background: Laparoscopic sleeve gastrectomy (LSG) is becoming a popular bariatric surgical procedure worldwide, considered to be safer than gastric bypass and more effective than gastric banding. However, advanced age is still a relative contraindication to this procedure. The aim of this study is to compare operative and postoperative outcomes of LSG in patients over and under 60 years old.

Methods: This was a retrospective study of 103 obese patients, who had undergone LSG between October 2008 and May 2015 in a tertiary center. Of these, 33 patients (32.6%) were 60 years or older. Body mass index (BMI), excess body mass index loss (EBL) and biochemical data (including lipid and glycemic profiles) at baseline, 3, 6, 12 and 36 months following LSG were evaluated. We also determined short and long term complication rates and resolution of co-morbidities such as diabetes, hypertension and obstructive sleep apnea. The results between patients over and under 60 years were compared.

Results: The baseline weight and biochemical profile were comparable between groups. Mean EBL at 6 and 12 months was 55.7% and 62.7% in the younger group, compared to 46.6% and 48.7% in the over 60 group ($P < 0.05$) but at 36 months it did not differ between groups (55% in the younger group versus 44% in the older group; $P = 0.36$). Lipid and glycemic profiles suffered a significant improvement in both groups at all times (HDL cholesterol increased, while LDL, total cholesterol, triglycerides, fasting glycemia and HbA1c decreased, $p < 0.05$ each), without significant difference between groups. Although there was a decrease in co-morbidities in both groups after LSG, it was significantly higher in the younger group ($P < 0.05$). There was no operative mortality and the early complication rate was similar in both groups (13.4% versus 12%).

Conclusions: LSG seems to be a safe and effective treatment for morbidly obese patients aged 60 or older, with favourable outcomes in terms of anthropometric and biochemical profile, until 36 months after the procedure. The difference in the co-morbidities results may be explained by age, as it is a known risk factor for hypertension and diabetes.

PO1.230

Metabolic syndrome in obese patients submitted to bariatric surgery: A 2-year follow-up study

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Background: Obesity is a risk factor for several comorbidities, including metabolic syndrome (MS), cardiovascular disease and type 2 diabetes mellitus. Bariatric surgery (BS) the most effective therapeutic strategy to promote significant and sustained weight loss, reducing the comorbidities associated.

Objectives: The present study Aims: to evaluate the impact of BS on remission of MS, comparing three different bariatric surgical procedures – adjustable gastric banding (AGB), Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG).

Material/Methods: We performed a retrospective longitudinal study of 1184 obese patients undergoing BS between January/2010 and July/2014 at our centre. Patients who had no record of MS criteria or therapy were excluded. We used the MS criteria recommended by the International Diabetes Federation. Statistical analysis was performed using Chi-square and Nonparametric McNemar tests. A two-tailed $p < 0.05$ was considered statistically significant.

Results: A total of 723 patients were included, 629 women (87.0%) and 94 men (13.0%). The preoperative frequency of MS was 67.8%. Of these, 26.7% had the five criteria. Of the patients with MS: 27.1% were submitted to AGB, 56.1% to RYGB and 16.7% to SG. At 12 months postoperatively, only 32.2% of patients had MS, 22.8% with the five criteria, observing a statistically significant remission of 55.8% ($p < 0.001$). We found a greater regression in patients undergoing SG (63.6%) and RYGB (63.5%) compared to AGB (38.1%) ($p < 0.001$). At 24 months postoperatively, MS was present in 29.2% of patients, thus increasing the remission to 60.5% ($p < 0.001$). During the 24 months of follow-up, the most normalized parameter was fasting glucose (6.6%), followed by waist circumference (6.1%). Of the patients who remained with MS, 42.9% were submitted to AGB, 34.7% to RYGB and 22.4% to SG ($p < 0.001$).

Conclusion: BS results in a significant and sustained reversal of MS in obese patients over 24 months. We observed a statistically significant difference between the three surgical procedures, with lower efficacy of AGB compared to SG and RYGB.

PO1.231

Greater curvature plication versus laparoscopic sleeve gastrectomy: 3-years results of randomized controlled trial

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Background. Laparoscopic greater curvature plication (LGCP) is a new restrictive bariatric procedure which has a similar restrictive mechanism like laparoscopic sleeve gastrectomy (LSG) without potential risk of leak. Aim of the study was to compare 3-years outcomes of LSG and LGCP. **Methods.** Multicenter prospective randomized trial was started in 2010. A total of 54 patients with morbid obesity were allocated either to LGCP group ($n = 25$) or LSG group ($n = 27$). Main exclusion criteria were: ASA $> III$, age > 75 , BMI $> 65 \text{ kg/m}^2$. There were 40 women and 12 men, mean age was 42.6 ± 6.8 years (range, 35–62). Data about operation time, complications, hospital stay, body mass index loss (BMIL), percentage of excess weight loss (%EWL), loss of appetite and improvement of comorbidities were collected during the follow-up examinations.

Results. All procedures were completed laparoscopically. The mean operative time was 92.0 ± 15 min for LSG and 73 ± 19 min for LGCP ($p > 0.05$). The mean hospital stay was 4.0 ± 1.9 days in the LSG group and 3.8 ± 1.7 days in LGCP group ($p > 0.05$). One year after surgery, the mean %EWL was $59.5 \pm 15.4\%$ in LSG group and $45.8 \pm 17\%$ in LGCP group ($p > 0.05$). After 2 years, mean %EWL was $78.9 \pm 20\%$ in the LSG group and $42.4 \pm 18\%$ in the LGCP group ($p < 0.01$). After 3 years, mean %EWL was 72.8 ± 22 in the LSG group and only 20.5 ± 23.9 in the LGCP group ($p < 0.01$). Loss of feeling of hunger 2 years after surgery was 25% in LGCP group and 76.9% in the LSG group ($p < 0.05$). The comorbidities including diabetes, sleep apnea and hypertension, markedly improved in the both groups.

Conclusion. The short-term outcomes demonstrated equal effectiveness of the both procedures, but 3-years follow-up showed that LSG is better as a restrictive procedure than LGCP.

PO1.232

The effect of laparoscopic gastric banding in women carrying rare variants of {MC4R} gene

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Background and Aims: Mutations in MC4R gene became known as the most common genetic cause of human obesity. However, two nonsynonymous variants (V103I and I251L) have been identified as protective against obesity. Our aim was to determine the differences in excess body weight loss after bariatric surgery in carriers and non-carriers of MC4R variants 6 months after the surgery.

Materials/Methods: Our cohort consisted of 17 Type 2 diabetic morbidly obese women [body mass index (BMI): median (IQL, UCL): 43.8 (38.9; 48.5) kg/m²; age: 57.5 (42; 60) years], who underwent laparoscopic adjustable gastric banding (LAGB). Three PCR products (three parts of a single exon of the MC4R gene) were pooled together and analyzed by next generation sequencing (NGS) approach using Nextera XT Sequencing Kit (MiSeq, Illumina, San Diego, CA, USA).

Results: We found two variants with low frequency (V103I rs2229616 and I251L rs5282087) and two variants in the promoter region (-220G/A and -178A/C) in MC4R gene in 4 women. Women with variants I251L and -178 A/C, reached the highest excess weight loss (EWL, 59.1% and 57.8%, resp.) and it significantly exceeded the EWL of the women from the non-carriers (reference group, RG: $P < 0.001$). Although the initial body weight in woman with promoter variant -178A/C (142kg) was higher compared to RG (125 kg (105; 132) kg), her BMI did not differ in comparison with the reference group due to her body height (184 cm) and her EWL was significantly higher than in RG. Body weight of the woman carrying V103I was higher (129 kg) in comparison with RG (112 (96; 117) six months after the surgery. It even increased by 1.5 kg and her fat mass increased by 6 kg.

Conclusion: Genetic factors strongly influence the effectiveness of bariatric surgery. It would be beneficial to recommend the type of bariatric surgery or another type of obesity management also according to human genotype.

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PO1.233

Effectiveness of different bariatric surgery procedures on type 2 diabetes remission

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Introduction: bariatric surgery improves glyco-metabolic control in patients with type 2 diabetes (T2D) until complete remission (fasting blood glucose < 100 mg/dl, HbA1c $< 6.0\%$, without pharmacological treatment). The different surgical procedures, however, have different effects on T2D remission.

Aim: to evaluate the effectiveness of different bariatric surgery procedures (Adjustable Gastric Banding, AGB; Mini Gastric Bypass, MGB; Sleeve Gastrectomy, SG) on T2D remission after one year of follow-up.

Methods: 83 patients with severe obesity and T2D were consecutively recruited. Of these, 21 underwent AGB (F/M: 16/5, age 40.7 ± 8.2 years, BMI 46.2 ± 5.8 kg/m²), 18 MGB (F/M: 13/5, age 50.6 ± 8.7 years, BMI 52.3 ± 10.0 kg/m²) and 16 SG (F/M: 13/3, age 42.6 ± 9.9 years, BMI 46.7 ± 4.8 kg/m²). Twenty-eight patients [control group (CG), F/M: 22/6, age 48.1 ± 9.6 years, BMI 46.6 ± 5.0 kg/m²] were treated with conventional medical therapy (diet, physical activity and hypoglycemic therapy). Percent of excess BMI lost (%EBL), fasting blood glucose, HbA1c and remission rate of T2D were evaluated in all patients before and after one year of follow-up.

Results: %EBL progressively increased from CG ($25.8 \pm 18.8\%$) to AGB ($42.1 \pm 17.2\%$, $P < 0.05$ vs. CG), MGB ($56.7 \pm 17.3\%$, $P < 0.01$ vs. CG and AGB), and SG ($70.6 \pm 15.1\%$, $P < 0.05$ vs. CG, AGB and MGB). Adjusting data for age, gender and baseline BMI, the same trend was observed for T2D remission rate: 3.6% (1/28) for CG, 23.8% (5/21) for AGB ($P = 0.05$ vs. CG), 72.2% (13/18) for MGB ($P < 0.0001$ vs. CG and AGB) and 87.5% (14/16) for SG ($P < 0.0001$ vs. CG and AGB).

Conclusions: bariatric surgery results in a significant weight loss that is associated with T2D remission. The effectiveness on T2D remission progressively increases from slightly restrictive procedures (AGB) to those more restrictive and/or with malabsorption (SG and MGB).

PO1.234

Helicobacter pylori infection in patients undergoing laparoscopic sleeve gastrectomy – correlations with weight status and metabolic parameters

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Background and Aims: The relation between *Helicobacter pylori* (HP) infection and obesity is still controversial. Also, there is still few data about HP infection in patients undergoing laparoscopic sleeve gastrectomy (LSG). The aim of this study was to determine the relation between presence of HP infection prior to surgery and anthropometric and metabolic parameters in a group of bariatric patients monitored in our hospital.

MATERIAL- METHOD: We investigated patients who underwent LSG between March and August 2015 with no prior diagnosis of diabetes. We assessed weight (W), height and calculated body mass index (BMI), waist circumference (WC), glycated hemoglobin (HbA1c), fasting plasma glucose (FPG) and insulinemia and calculated insulin resistance by HOMA-IR and insulin sensitivity by QUICKI. Endoscopy was performed in all patients and gastric mucosa biopsy was obtained, to assess the presence of HP infection. All patients underwent DEXA examination to determine the percent of fat mass (%FAT).

Results: We studied 36 patients (25 female) with an average age of 39.7 ± 11.5 years, an average BMI of 44.8 ± 5.7 kg/m², WC of 128.2 ± 15 cm and %FAT of 42.8 ± 8.7 . Average FPG was 101.80 ± 20.8 mg/dl and HbA1c was $5.63 \pm 0.679\%$. The HOMA-IR was 5.9 ± 2.42 and QUICKI was 2.783 ± 0.18 . HP infection was present in 17 patients (47.2%). We compared the patients with HP infection with the others and found the those with HP infection had significantly higher BMI (46.9 ± 6.1 kg/m² vs. 42.8 ± 4.7 kg/m², $p = 0.036$), but the other anthropometric parameters, including %fat did not differ significantly between groups. Also, HOMA-IR and QUICKI were not significantly different in patients with HP infection vs. patients without HP infection.

Conclusions: In our small study, a high percentage (47.2) of patients had HP infection before undergoing LSG. They also had higher BMI than patients without HP infection, but not a higher percent of body fat and we showed no differences in insulin resistance between the groups.

Pregnancy After Bariatric Surgery: Results: Of a Single-Center Study

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Introduction: Bariatric surgery is an effective treatment for morbid obesity. Most patients are women of childbearing age, which raises important questions about the planning and monitoring of pregnancy.

Objective: Evaluate the impact of bariatric surgery on maternal and fetal outcomes.

Methods: Retrospective cross-sectional study of patients who underwent bariatric surgery between January 2010 and July 2014. We included women who became pregnant after bariatric surgery and we evaluated the data with respect to pregnancy, childbirth and newborns. We included women who became pregnant after bariatric surgery and data concerning pregnancy, childbirth and newborns was evaluated.

Results: In 1182 patients undergoing surgery, 1016(85.9%) were female. Pregnancy occurred in 39 women with an average age of 31(4.8) years old. Among them, there was one twin pregnancy and one spontaneous abortion. Twenty-nine women underwent gastric bypass, gastric band was performed in 7 women and the remaining underwent gastric sleeve. The mean time interval between surgery and pregnancy was 16.6 (4.8) months, however 16 (41%) women became pregnant in less than a year after surgery. The pre-surgery BMI was 44.5(6.2)kg/m². Women had a mean BMI of 30.2(3.8)kg/m² when they got pregnant and gained 13.2(7.3)kg during pregnancy. Anemia was observed in 18(46.1%) women, 16(45.7%) had vitamin B12 deficiency, 12(66.8%) had zinc deficiency and 28(71.8%) had vitamin D deficiency. Three women had gestational diabetes and one hypertension. There were no complications associated with gastric band or dumping syndrome. Premature rupture of membranes occurred in two pregnancies and preterm delivery in 5. Cesarean section was performed in 7 deliveries. The average weight of the newborns was 3,002.6(587.3)g. Five newborns had low birthweight and 1 had macrosomia. Three infants had to be admitted in an intensive care unit.

Conclusion: Although the pregnancy after bariatric surgery is safe and well tolerated, a close monitoring by a multidisciplinary team is required to evaluate the complications of surgery, including micronutrient deficits.

idemia in 70%, Hypercholesterolemia in 50% and all patients are type 2 diabetes, and most of them have antidiabetic therapy for at least 3 years. There are one complete stricture at gastroileal anastomosis which is revised after 3 months. Follow up is complete in all patients. EBWL reached 95.6% at one year. At one year mild anemia in one patient and one patient has low albumin level but above 3, all patients have normal glucose level in the first month after surgery with no need to antidiabetic therapy. SASI bypass is a promising operation which offers excellent weight loss and metabolic result. The elimination of two ways for passage of food and one anastomosis decrease nutritional deficiency and the possibility of surgically related complications.

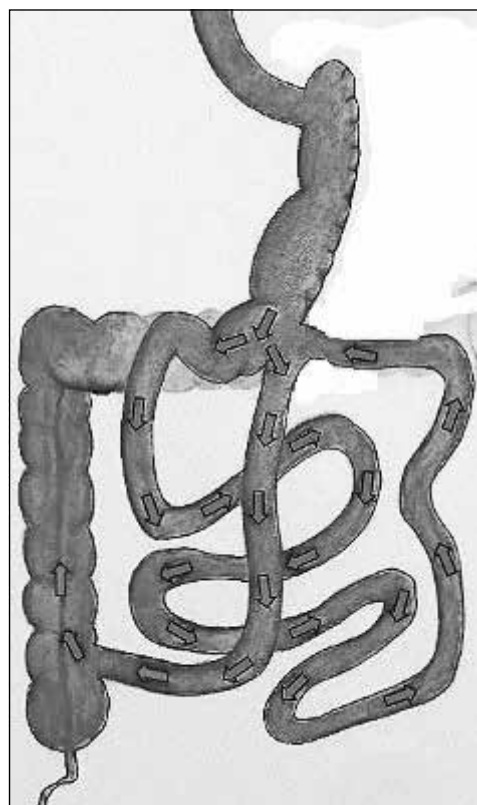


Fig.1. SASI Bypass

Sleeve gastrectomy and anastomosis of ileum 250 cm from the iliocecal valve to the antrum of stomach

Efficacy of single anastomosis sleeve ileal (SASI) Bypass for type-2 diabetic obese patients: Loop gastric bipartition, a novel metabolic surgery procedure

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SASI bypass is a Novel Metabolic/Bariatric Surgery operation based on mini gastric bypass operation and Santoro's operation in which a sleeve gastrectomy is followed by an side to side gastroileal anastomosis. We review the results obtained on the first 50 patients who underwent laparoscopic SASI bypass with one year follow up. Sleeve gastrectomy was performed over a 36-Fr bogie, 6 cm from the pylorus, and 250 cm from the ileocecal valve the ileum brought to be anastomosis side to side with the antrum. 17 men and 33 women with mean BMI 47 Kg/m² were operated on. Hypertension was present in 25%, sleep apnea in 10%, hypertriglycer-

Sleeve gastrectomy versus gastric bypass: 5 years follow-up

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Background and Aims: Obesity is directly related to an increased risk of diabetes mellitus, cardiovascular disease, and overall mortality. Bariatric surgery (BS) is an effective therapy for sustained weight loss and type 2 diabetes (T2D) remission in most of the morbidly obese patients. Nevertheless the most part of the current data are limited at 1–3 years follow-up. Little is known about the long term evolution after bariatric surgery and even less information exists about which surgical technique is more effective.

Objectives: To compare sleeve gastrectomy (SG) and Y-de-Roux gastric by-pass (RYGB) and to valuate the evolution at 5 years of follow-up in terms of T2D remission and sustained weight loss in patients submitted to BS.

Methods: retrospective study of 175 morbidly obese patients who underwent BS between the years 2002–2009. Patients who had a second-stage surgery were excluded.

Results: The patients were divided into two groups: 50 patients underwent to SG and 125 patients underwent to RYGB. We did not find any differences between the two groups regarding gender (78% women and 77.6%), age (43.02 ± 11.02 and 45.5 ± 5.11 years), previous BMI (45.59 ± 5.39 kg / m² and 48.57 ± 5.51 kg / m²) and the presence of T2D (24% in both groups). At 5 years follow-up, the BMI was 37.05 ± 7.16 kg/m² in the SG group and 31.5 ± 3.86 kg / m² in the RYGB group ($p = 0.028$). At 1 year, 93.7% of the patients in the RYGB group and 88.8% in the SG group achieved T2D remission ($p = 0.025$). After 5 years, only 38.46% of patients in the SG group persisted in T2D remission versus 86.7% in the RYGB group ($p = 0.019$).

Conclusion: In our study, BS was effective in sustained weight loss and remission of T2D at long term follow-up. RYGB was superior to SG in achieving these goals. More studies are needed to confirm these results and to identify long-term responders in the setting of BS.

PO1.238

Bariatric surgery in Type 2 Diabetics: The financial impact on the local health economy

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Aims: The case for health improvement following bariatric surgery is now well-established, with robust epidemiological evidence in a multitude of metabolic diseases, including Type 2 Diabetes. However, the cost-implications have yet to be fully, objectively quantified. We set out to calculate the advantage to the local health economy, based on improvements in glycaemic control following bariatric surgery. We compared data from our bariatric surgery centre, against BOMSS guidelines, over an initial 3-year period.

Methods: We used the Worcestershire Royal Hospital electronic notes system to collect information on 134 patients who underwent bariatric surgical interventions between June 2012 and November 2015, then analysed this data. Using the average life expectancy for males and females in England in 2015, with the cohort average age, we estimated the average years of life remaining per patient. We used estimated yearly costs of diabetic inpatient and outpatient care to approximate possible savings to the NHS.

Results: 134 patients (100%) met BOMSS criteria for surgery, and had appropriate pre-operative diabetic specialist and dietician input. 24% (32) were males and 76% (102) female, with an average age of 48.0 and average BMI of 50.2. 55 patients (41%) had type 2 diabetes; 14 on insulin, 8 on insulin and oral agents, 23 on oral agents, and 10 diet-controlled. Post-operatively 29 patients (53%) were off-treatment completely, 11 (20%) had treatment reduced, and only 5 (9%) had no changes to therapy. We used Diabetes UK data regarding inpatient and outpatient diabetic care costs. Within our cohort of 29 patients no longer requiring treatment, we calculated potential outpatient and inpatient savings of £357,790 and £2,417,500 respectively.

Conclusions: We have demonstrated, in our small cohort, of Type 2 Diabetics having undergone bariatric surgery, that the local health economy would be likely to benefit from significant long-term savings of up to £95,000 per patient lifetime.

PO1.239

The role of antral resection on outcomes of sleeve gastrectomy for morbid obesity: A prospective randomized study

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Background. Laparoscopic sleeve gastrectomy (LSG) is a popular surgical method for treatment of morbid obesity, but the technique of this procedure is not standardized. Aim of the study was to investigate the role of antral resection on effectiveness of the procedure in terms of weight loss.

Methods. A prospective randomized study was performed in our clinic from 2012 to 2014. Patients enrolled in the study were randomized into two groups: group 1 (22 patients, gastric transection started 2 cm proximal to the pylorus), and group 2 (23 patients, gastric transection started 6 cm proximal to the pylorus). There were 38 women and 7 men. Mean pre-operative weight was 138.9 ± 21 kg (range, 98 - 182), mean preoperative excess weight was 70.4 ± 18.2 kg (range, 36.5 - 110.8), mean preoperative BMI was 49.6 ± 6.8 kg/m² (range, 38 - 65). Preoperative data were comparable in both groups regarding age, sex, BMI, and comorbidities. The primary outcome measure was the percent of excessive weight loss (%EWL), secondary outcomes included postoperative morbidity and improvement of comorbidities.

Results. There were no serious postoperative complications in the both groups. After 24 months in group 1 the mean %EWL was 58.6 ± 13.9 , in group 2 - 54.2 ± 12.6 ($p > 0.05$). There was significant improvement in comorbidities after LSG in the both groups, but there was no significant difference between groups in the number of complications.

Conclusions. LSG is safe and effective procedure with good short-term outcome. There is a tendency of better weight loss in the group with increased size of resected antrum.

PO1.240

Weight gain after bariatric surgery ? What are the determining factors in the postoperative period of bariatric surgery

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Introduction: Bariatric surgery leads to an average loss of 60 to 75% of excess body weight with a maximum weight loss in the period between 18 and 24 months postoperatively.

Material/Methods: Retrospective study of patients undergoing bariatric surgery in the 2007–2011 period, assessing whether there was weight gain to 12, 24, 36 and 48 months. The variables analyzed were age, gender, occupation, post-operative time, weight and body mass index (BMI), type of bariatric surgery performed

Results: In this period 273 patients were operated, lying about 91 patients with increased weight (BMI > 30 kg/m²). We treated up to 86 women, 5 men, mean age of 42 years. The weight and the mean BMI preoperatively were respectively 116 Kg and 46.83 kg/m². The achieved weight and the mean BMI was lowest at 12 months, respectively 81.5 kg and 32.18 kg/m². Weight and BMI attained at 24 months were respectively 82.0 kg and 33.16 kg/m², at 36 months was 85.1 kg respectively, 33.78 kg/m². The weight and the mean BMI at 48 months was the highest after the surgery, respectively 87.4 kg and mean BMI 35.03 kg/m². In this sample, bypass surgery was performed in 20 cases and gastric sleeve in 71 cases. Regarding the attendance in the consultation, about 15 patients abandoned after four years, 25 patients were discharged and 48 patients continued in follow up.

Discussion: Bariatric surgery is a treatment option with documented efficacy in patients with severe obesity. This procedure has some limitations and the weight regained is one of them.

PO1.241

Is SPIDER® Sleeve Gastrectomy Superior to Laparoscopic Sleeve Gastrectomy; results in 400 patients with 2 years follow up

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Background: The introduction of single port instrument delivery extended reach (SPIDER®) surgical system allows triangulation of the surgical instruments without crossing (1). New approach in the Single Incision Laparoscopic Surgery with easy handling (SILS) (2,3). AimS: To illustrate the details of SPIDER® technique and comparing its result with traditional Laparoscopic Sleeve Gastrectomy (LSG) in terms of percentage of excess weight loss and BMI in 1, 3, 6, 12 and 24 months, effect on comorbidities (Diabetes and Hypertension), complications rate, financial cost and patients' satisfaction in 400 patients.

Method: Retrospective analysis of prospectively collected data of 200 patients in each arm performed at Hamad General Hospital- Qatar between 2012–2014 with follow up at 1, 3, 6, 12 & 24 months. **RESULT:** LSG vs. SPIDER®. Pre-operative: BMI (49.1 vs. 43.8), age (38 vs. 33), Diabetes (56 vs. 43 cases), and Hypertension (55 vs. 33 cases). Post-operative outcomes (follow up at 6, 12, 24 months) - %EWL: 50.8%, 62%, 67% vs. 54.3%, 66%, 67%; BMI: 36.4, 33.6, 34 vs. 33.4, 30.8, 30.3; and Length of hospital stay: 4.7 vs. 3.3 days. Complications occurred in both groups, e.g. intra-operative bleeding (2 vs. 3 patients), leak (1 vs.1), stenosis (2 vs. 3), and surgical site infection (2 vs.3). Due to technical difficulties 6 cases of SPIDER® were converted to regular LSG.

Conclusion: At 2 years post operatively, this large cohort of SPIDER® shows results comparable with LSG in terms of BMI, %EWL and complications. SPIDER® overcomes the crossover and difficult handling associated with SILS. SPIDER® can be considered a viable alternative to LSG with similar overall outcomes.

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Fig. 1. SPIDER Surgical System Flexible Right & Left Instruments



Fig. 2. SPIDER System Intra-Operative Easy Dissection

PO1.242

Eating behaviors after bariatric surgery: A longitudinal study comparing primary and revisional bariatric surgery patients

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Background: Eating behaviors have been associated with poor weight loss after bariatric surgery. With an increasing number of revisional surgeries due to poor weight outcomes, little is known about disordered eating in revisional surgery candidates.

Objectives: This study compare eating behavior between revisional surgery candidates and primary surgery patients.

Material/Methods: This longitudinal study assessed 55 primary surgery (P-Group: 15 sleeves; 41 RYGB) and 36 revisional surgery (R-Group: 8 sleeves; 28 RYGB) patients prior to surgery and at 3 months follow-up. Assessment consisted of a set of questionnaires and a clinical interview addressing objective/subjective binge episodes (OBE and SBE) objective/subjective overeating episodes (OOE and SOE) and picking or nibbling.

Results: Reasons for revisional surgery included weight regain (37.84%), medical complications (32,43%); both (21,62%); others (8,11%). R-Group present higher percentage of patients reporting OBE and OOE. When OBE and SBE (= BE) and OOE and SOE (= OE) were combined, no differences were found between groups on BE. R-Group presents significantly more OE episodes at 3 month. R-Group presents higher BMI and less weight loss.

Conclusion: A great percentage of revisional patients report weight regain not related to medical complications. A significant improve in all eating behaviors and psychological symptoms was observed for both procedures. R-Group seems to present more disordered eating behaviors. More research is needed in longer follow-up times.

PO1.243

Efficacy and safety of laparoscopic gastric plication in low BMI obese patients

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Background & Aims: Laparoscopic gastric plication (LGP) is a fairly new restrictive bariatric procedure that seems attractive for obese patients due to presumed higher safety profile and lower cost compared to other bariatric surgeries.

Objectives. This study aimed to evaluate the efficacy and safety of LGP in mildly obese patients with a body mass index (BMI) of 30–35 kg/m².

Patients & Methods. One hundred twenty four mildly obese patients who underwent LGP between March 2011 and November 2014 were retrospectively reviewed. Demographics and surgical outcomes were analyzed.

Results. The mean age of included patients was 27.5 years and 82% of them were females. The preoperative BMI was 32.7 ± 1.6 . The mean operative time was 65.3 minutes and the mean hospital stay was 2.9 days. Major complications requiring invasive intervention developed in the form of leakage in three patients (2.4%). The percent of excess weight loss (%EWL) was 60.2% at mean follow-up of 24 months.

Conclusions. LGP achieved reasonable weight loss outcome for mildly obese patients but was associated with relatively high major complication rate. Further studies are required to evaluate the role of LGP in such patient category.

PO1.244

Changes in carbohydrate and lipid metabolism in obese diabetic women 2 years after different types of bariatric surgery

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Introduction: Carbohydrate and lipid metabolism predominantly fatty acid composition in serum lipids, cell membranes and also adipose tissue lipids are closely related in healthy subjects but also under metabolic disturbances as type 2 diabetes and obesity. Effect of different types of bariatric surgery on change in carbohydrate and lipid metabolism and their relationship was examined in obese diabetic women 2 years after the operation.

Methods: Severely obese women underwent one of the three bariatric methods- biliopancreatic diversion (BPD), $n = 8$, laparoscopic gastric banding (LAGB), $n = 9$, and laparoscopic greater curvature plication (LGCP), $n = 12$. Diabetes duration did not differ between individual groups. Meal test, euglycemic hyperinsulinaemic clamp, analysis of fatty acid composition of adipose tissue and anthropometric characteristics measurement were performed before the treatment and 2 years after the surgery.

Results: The highest weight loss was found after BPD as expected, BPD was the most effective method for diabetes remission achievement. Higher hemoglobin A1c (HbA1c) decrease was positively correlated with decrease in saturated fatty acid (FA) percentage in adipose tissue (AT) 16:0, 18:0, AT alpha-linolenic acid, sum of saturated FA and elongase decrease, negative correlation with change in 12:0, 14:0, 14:1n-5, 18:1n-7, sum of mono-unsaturated FA and delta-9 desaturase was found ($P = 0.024$). Change in mean insulin during the meal test calculated from insulin AUC was negatively correlated with change in polyunsaturated FA (20:3n-6, 22:4n-6, 22:5n-3), sum of PUFA and delta-5 desaturase ($P < 0.001$). Change in integral of total insulin secretion during the meal test correlated positively with change in 18:0 and 18:3n-3 and negatively with change in 18:1n-7, PUFA (20:3n-6, 22:4n-6, 22:5n-3), in delta-9 desaturase and delta-5 desaturase ($P < 0.001$).

Conclusion: Changes in carbohydrate metabolism after bariatric surgery in obese diabetic women were significantly related to change in fatty acid composition of adipose tissue after two year follow-up. The results suggest mostly positive relation of polyunsaturated fatty acids percentage in adipose tissue to change in glucose metabolism. The relationship to saturated FA differs according to the chain length of SFA. Research relating to this abstract was funded by grant IGA NT-13735-4 and MZ, 00023761 Ministry of Health Czech Rep.

PO1.245

Sucrosomial iron: An alternative therapy in the treatment of refractory iron deficiency anemia after bariatric surgery in patients actually treated with parenteral iron

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Background and Aims: Bariatric surgery is currently the most effective long-term treatment of morbid obesity, but it is associated with an important risk of nutrients deficiency, especially iron in childbearing age women. A significant percentage of these patients require parenteral supplementation with iron due to digestive intolerance or failure to oral supplementation treatment. Chronic parenteral treatment with iron is associated with a potential risk of iron overload.

Objective: To evaluate the efficacy and tolerability of oral liposomated iron as alternative therapy in patients who require parenteral treatment with iron after bariatric surgery.

Methods: We have designed a single center, open, prospective, interventional trial, including 40 women of childbearing age, who previously undergone Y-de-Roux gastric by-pass, and currently require chronic intravenous iron therapy. The subjects were divided into 2 parallel groups: 20 cases and 20 controls matched by age, previous level of hemoglobin, years after surgery and percentage of weight lost. The 20 cases were discontinued from the parenteral iron treatment and were treated with oral liposomated iron 28mg/day for three months. The 20 controls continued with 300mg iron sucrose endovenously every three month. Total hemoglobin (Hb), ferritin and transferrin saturation index (TSI) were determined before and after three months of treatment in both groups.

Results: No significant differences were seen between the levels of Hb (12.67 ± 1.06 vs 12.267 ± 1.35 g/dl, $p = 0.081$), ferritin (101.67 vs 88.89 ng/dl, $p = 0.069$) and TSI (24.11% vs 26.28% , $p = 0.55$) before and after the 3 month of treatment with liposomated iron. We did not found any adverse effect during this period in the treatment group. Compared to the control group, the final Hb levels were similar (Hb 12.267 ± 1.35 g/dl and 12.1 ± 1.74 g/dl respectively, $p = 0.09$).

Conclusion: Our study suggests that oral liposomated iron might represent an alternative therapy in patients who require parenteral treatment with iron after bariatric surgery.

PO1.246

Reduced circulating ANGPTL8/betatrophin concentrations in obesity increase after surgically-induced weight loss, but not after diet-induced weight loss

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Introduction: ANGPTL8/betatrophin is a secreted protein reported to be involved in β -cell replication that has recently been shown to be more related to lipid metabolism. Weight loss represents a clinical situation of improvement of glucose homeostasis and overall metabolic control. The aim of the present study was to compare the circulating concentrations of ANGPTL8/betatrophin in human obesity and type 2 diabetes (T2D) as well as to analyse the impact of weight loss induced by either a conventional dietary treatment or bariatric surgery on ANGPTL8/betatrophin levels.

Methods: Serum concentrations of ANGPTL8/betatrophin were measured by ELISA in 123 subjects: 75 obese normoglycemic subjects (OB-

NG), and 15 obese subjects with T2D (OB-T2D) matched by sex, age, and body adiposity, were compared with 33 lean normoglycemic individuals (LN-NG). Furthermore, serum levels of ANGPTL8/betatrophin were measured in 158 subjects before and one-year after weight loss induced either by conventional dietary treatment (n = 38), or bariatric surgery (sleeve gastrectomy, SG n = 20 or Roux-en-Y gastric bypass, RYGB n = 100).

Results: Circulating levels of ANGPTL8/betatrophin were significantly decreased in obese individuals and further reduced in T2D subjects (LN-NG, 45.1 ± 24.4 ng/mL; OB-NG, 26.9 ± 15.4 ng/mL; OB-T2D, 13.5 ± 8.8 ng/mL; $P < 0.001$). Massive surgery-induced weight loss after SG or RYGB was accompanied by a statistically significant increase in circulating levels of ANGPTL8/betatrophin (28.1 ± 13.9 to 40.3 ± 22.8 ng/mL, $P = 0.001$ after SG; 24.6 ± 10.9 to 41.7 ± 19.4 ng/mL, $P < 0.001$ after RYGB), while remaining unchanged 25.6 ± 13.3 to 25.4 ± 10.7 ng/mL ($P = 0.891$) after diet-induced weight loss. The change in ANGPTL8/betatrophin levels was positively correlated with the change in HDL-C concentrations.

Conclusion: Serum ANGPTL8/betatrophin is decreased in human obesity, being further reduced in obesity-associated T2D. Our study shows that serum ANGPTL8/betatrophin concentrations are increased in obese subjects after surgically-induced weight loss, but not after weight loss achieved by conventional dietary treatment. The change in ANGPTL8/betatrophin concentrations emerged as a significant predictor of the change in HDL-C levels after weight loss.

PO1.247

Bariatric surgery leads to functional recovery of the liver – a prospective cohort study with the LiMax test

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Background: Up to 85% of obese individuals suffer from nonalcoholic fatty liver disease (NAFLD). Bariatric surgery provides long-term weight loss and has been shown to improve NAFLD and NASH. The aim of this study was to evaluate the liver function in obese patients and its recovery after bariatric surgery with a non-invasive test method.

Methods: In a prospective cohort study from October 2011 to December 2014, morbidly obese patients (n = 45) undergoing bariatric surgery were assessed for functional liver recovery. Liver function capacity was determined by the LiMax test (enzymatic capacity of cytochrome P450 1A2) preoperatively, 6 and 12 months postoperatively. Liver biopsy specimens were obtained intraoperatively and classified according to the NAFLD activity score (NAS).

Results: Before surgery, mean body mass index (BMI) was $53 (\pm 8)$ kg/m². Mean percent excess BMI loss was 51% after 6 months and 72% after 1 year. Mean liver function capacity significantly increased from $266 (\pm 90)$ µg/kg/h preoperative to $332 (\pm 82)$ µg/kg/h after 6 months and $350 (\pm 93)$ µg/kg/h after 12 months. Median NAFLD activity score was 3 (IQR = 4) and showed a negative correlation with liver function capacity.

Conclusions: Bariatric surgery leads to a significant functional liver recovery. LiMax testing as a non-invasive test method may be useful in diagnosis of NAFLD and monitoring the course of the disease.

PO1.248

Unexplained abdominal pain after bariatric surgery

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Background: Bariatric surgery has great results concerning weight loss and improvement of comorbidities. However, there is a 10% risk for post-operative complications and 15–20% risk for late complications. Next to the known complications, such as leakage, bleeding and internal herniation, there is a substantial group of patients who develop unexplained abdominal pain after bariatric surgery. **Objectives:** To inventory the percentage of patients who develop un

explained abdominal pain after Laparoscopic Roux-en-Y Gastric Bypass or Laparoscopic Sleeve Gastrectomy, to determine predictive factors for this outcome.

Methods: A retrospective study was performed, using a consecutive database with all patients who underwent bariatric surgery. Baseline characteristics and the postoperative course were evaluated.

Results: A total of 1788 patients underwent bariatric surgery between November 2007 and April 2015. Abdominal pain was presented in 387 patients (21.6%), who were therefore included. The study population consisted of 337 (87.1%) women and 50 (12.9%) men; the mean age was 43.3 (standard deviation 10.1) years and the median body mass index before surgery was 43.7 kg/m². Abdominal pain was explained in 246 out of 387 patients (63.6%), whereas this remained unexplained within 133 patients (34.4%). Revisional surgery was a significant predictor for unexplained pain ($p = 0.047$). The majority of patients in the unexplained pain group had a mixed defecation pattern, in the explained pain group the majority of patients had discolored stool or obstipation. Type and place of pain, number of readmissions, diagnostics and emergency room presentations were not significantly different between patients with and without explained abdominal pain.

Conclusion: A total of 387 patients experienced abdominal pain (21.6%). In nearly two-third of these patients, the pain was explained. However, in one-third (7.4% of the entire bariatric surgery population) no diagnosis was found as explanation. Current study results suggest that unexplained abdominal pain should be added to the complication list and that more research is needed regarding further management of this chronic, and patient burdensome complication.

PO1.249

Effect of gastric bypass on bone mineral density, parathyroid hormone and vitamin D: 5 years follow-up

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Background: the aim of the present study was to see if there are longitudinal changes in bone mineral density (BMD), vitamin D or parathyroid hormone (PTH) in females five years after Laparoscopic Roux-en-Y Gastric Bypass (LRYGB).

Methods: 32 women with mean age 41.6 ± 9.3 years and mean body mass index (BMI) 44.5 ± 4.6 kg/m² were included. Preoperatively, 2 and 5 years postoperatively, BMD, weight, height, S-calcium, S-albumin, S-creatinine, S-25(OH)-vitamin D and fP-PTH were measured.

Results: the mean decrease in BMI between baseline and 5 years after surgery was 29, 4%. BMD of the spine and femur measured as z- and t-scores, showed a linear, statistically significant declining trend over the years. The fall in BMD of the spine and femoral neck between baseline and 5 years after surgery was 19% and 25%, respectively. The mean fP-PTH showed a significant increase over the study period (20.2 µg/L increase, 95% CI: -31.99 ; -8.41). S-calcium, both free and corrected for albumin, showed a decrease between base-line and 5 years after surgery. Eight patients developed osteopenia and one osteoporosis after five years follow-up.

Conclusion: LRYGB is an efficient method for sustained long-term body weight loss. There is, however, a concomitant decrease in BMD and S-calcium, and an increase in fP-PTH.

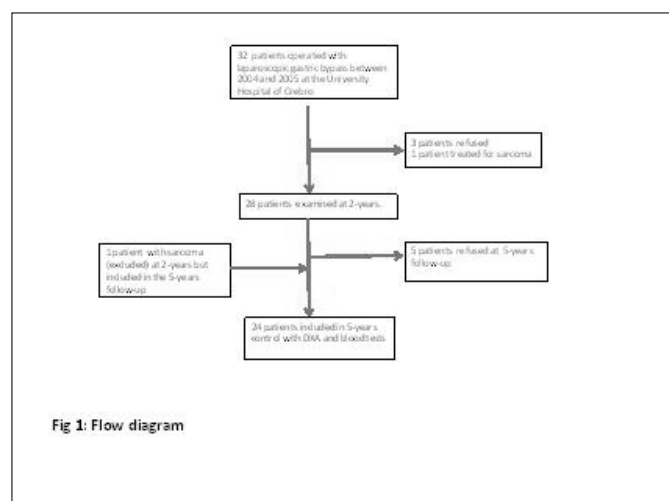


Fig. 1. Flow diagram The flow diagram of patients.

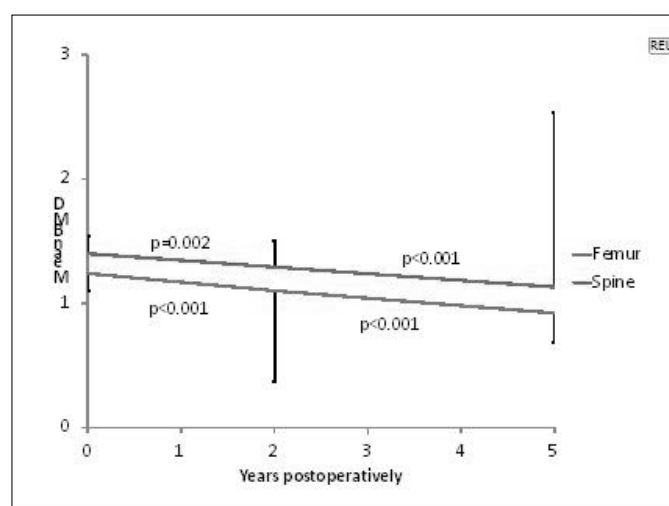


Fig. 2. Mean BMD changes over year Mean BMD changes over year for Femur neck and Lumbar spine.

Table 1: Clinical characteristics and variables at baseline and after 2 and 5 years, expressed as means and SD. T-test for paired data performed with relative p-values.						
Variable	Baseline (n=32)	After 2 years (n=23)		After 5 years (n=25)		
	Mean±SD	Mean±SD	p-value 2 years vs. baseline	Mean±SD	p-value 5 years vs. baseline	p-value 5 years vs. 2 years
BMI	44.5±4.6	40.1±5.2	<0.001	35.4±5.6	<0.001	0.05
Weight	224.6±56.4	181.4±54.5	<0.001	166.3±53.5	<0.001	0.001
%Body fat	53.1±5.1	43.7±7.8	<0.001	44.6±7.7	<0.001	0.011
BMD Spine	1.46±0.14	1.29±0.11	0.002	1.13±0.14	<0.001	<0.001
BMD Femur neck	1.34±0.13	1.20±0.12	<0.001	0.92±0.14	<0.001	0.02
Total bone z-score	0.57±0.72	0.49±1.07	0.32			
Spine z-score	0.57±1.15	0.37±1.65	0.42	-0.67±1.40	<0.001	<0.001
Femur neck z-score	0.85±1.17	0.34±1.17	0.002	-0.42±1.09	<0.001	<0.001
Total bone S-score	-2.83±3.99	0.97±1.18	0.024			
Spine S-score	1.76±1.12	0.74±1.69	<0.001	-0.43±1.38	<0.001	<0.001
Femur neck S-score	1.85±1.10	0.69±1.35	<0.001	-0.29±1.37	<0.001	<0.001
fP-PTH*	63.3±20.1			82.5±13.8	0.002	
S-ALP**	47.7±15.8			47.1±14.6	0.97	
Corrected Ca*	2.29±0.09	2.19±0.08	<0.001	2.36±0.07	0.30	<0.001

Fig. 1. Results: of DXA and Blood investigations.

PO1.250

Fasting and stimulated glucagon and insulin levels in the long-term period after biliopancreatic diversion

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Objectives: The secretory response of incretins is changed after bypass bariatric surgery, but the long-term consequences on glucagon production are not established. The aim of the study was to compare fasting and stimulated glucagon and insulin levels in patients who underwent biliopancreatic diversion / duodenal switch surgery (BPD/DS) more than 2 years ago and in healthy normal weight controls.

Methods: Patients after BPD/DS were included in the 1st group (n = 23), post-operative period median was 4.7 years [2.3–7.2]. Type 2 diabetes mellitus before the operation was the exclusion criteria. The 2nd group were normal weight controls (n = 22). Blood glucose levels, IRI and glucagon concentrations were measured during the OGTT (with 75 g glucose) at 0, 30, 60 and 120 minutes in all patients.

Results: The maximum of IRI concentration was found at the 30th minute of the OGTT in the both groups. Stimulated IRI concentration was significantly higher in the BPD/DS group (p = 0.026). AUC for IRI in BPD/DS group was 4894.5 [4381.4; 5863.5], AUC for IRI in the control group was 2298.7 [1987.5; 2565.0]. Fasting glucagon concentrations were similar in the surgical and control groups (0.18 ng/ml vs 0.17 ng/ml). During the OGTT in both groups the suppression of glucagon was noted at the 30th minute after oral glucose intake (0.08 and 0.05 ng/ml respectively), which was followed by a gradual increase in its level by the end of the test (0.15 and 0.12 ng/ml respectively). AUC for glucagon was 14.8 [14.3; 15.2] in BPD group and 12.5 [11.9; 13.1] in the controls.

Conclusion: In patients who underwent BPD/DS, the secretion of IRI in response to the oral glucose intake is significantly increased, the pattern of postprandial glucagon secretion is similar to healthy normal weight controls.

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PO1.251

Conversion of laparoscopic sleeve gastrectomy into laparoscopic Roux-en-Y gastric bypass and mini gastric bypass: Retrospective analysis of 23 cases

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Background: Laparoscopic Sleeve Gastrectomy (LSG) has been increasingly used as a primary bariatric procedure over the last decade. However, weight loss failure occurs in a significant number of patients. One option in order to achieve additional weight loss is conversion to laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic mini gastric bypass (LMGB).

Methods: Retrospective analysis was performed on patients undergoing conversion from LSG to LMGB or LRYGB for weight loss failure between 2012 and 2015 at the Limmattal Hospital in Zurich-Schlieren. Patients were reassessed for weight loss and complications at 6 and 12 months postoperatively.

Results: Twenty-three patients, 16 women and 7 men with a mean age of 45.4 years (range 25 to 70 years). The mean preoperative body mass index was 42.3 kg/m² (SD ±6.9 kg/m²). All conversions were performed laparoscopically. The mean excess weight loss (EWS) 12 months was 22.0% (SD ±17.5%) for the LMGB and 21.8% (SD ±13.1%) for the LRYGB respectively. There was 1 major complication with an overall morbidity rate of 13%. There was no mortality.

Conclusions: Conversion of LSG into LMG and LRYGB is feasible and safe. Both procedures are effective in the short term with a mean EWL of 21.9% at 12 months. Long-term results of LMGB and LRYGB as revisional procedure are awaited to establish its efficacy in the long term.

PO1.252

Redo surgery after failed open VBG: Laparoscopic mini gastric bypass versus laparoscopic roux en y gastric bypass. Which is better?

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Background: long term studies have reported that the rate of conversion surgeries after open VBG ranged from 49.7 to 56%. This study is aiming to compare between LMGB and LRYGB as conversion surgeries after failed open VBG with respect to indications and operative and post-operative outcomes

Methods: Sixty patients (48 females and 12 males) presented with failed VBG, an average BMI of 39.7 kg/m² ranging between 26.5 kg/m² and 53 kg/m² and a mean age of 38.7 ranging between 24 and 51 years were enrolled in this study. Operative and postoperative date was recorded up tone year after the operation.

Results: MGB is a simple procedure that is associated with short operative and low rate of complications. However, MGB may not be applicable in all cases with failed VBG and therefore RYGB may be needed in such cases.

Conclusion: LMGB is a safe and feasible revisional bariatric surgery after failed VBG and can achieve early good weight loss results similar to that of LRYGP. However, the decision to convert to lap RYGB OR MGB should be taken intra operatively depending mainly on the actual intraoperative pouch length.

PO1.253

Vitamin D loading dose supplementation after metabolic surgery and impact of biopsy-proven liver fibrosis and impaired renal function in morbidly obese patients

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Background & Aims: Vitamin D deficiency is common in bariatric patients [1] and in those with liver and chronic kidney disease. Particularly, there are limited data on therapeutic strategies in these patients.

Objectives: The primary objective was to examine whether oral vitamin D loading dose in the first month (intervention: 300,000 IU), compared to placebo (0 IU), with following maintenance dose (3420 IU/day; both groups) can significantly increase 25-hydroxy-vitamin-D₃ (25(OH)D₃) at 6 months postoperatively.

Material & Methods: We evaluated new supplementation regimen with 3 loading doses in the first month (100,000 IU each) followed by maintenance dose (3420 IU/day) in a double-blind, randomized controlled trial of 46 vitamin-D-deficient (< 75 nmol/l) patients undergoing ome-ga-loop-gastric-bypass. The placebo-group received placebo followed by standard dose (3420 IU/day). Vitamin D parameters (25(OH)D₃, 1α,25-

(OH)₂D₃, PTH, calcium) were measured [3]. In addition, sub-group analyses were performed in 14 patients with biopsy-proven liver fibrosis (F≥2) and in 20 patients with impaired renal function (eGFR < 90 ml/min/1.73m²). Linear mixed models were used (adjusted for baseline values, dosing, season, age, sex).

Results: 80% were women, aged 42 (13) years with BMI of 44 (4) kg/m². At 6 months, there was a significant group difference in 25(OH)D₃ [intervention vs. placebo: 68.9 (21.6) vs. 56.4 (22.5) nmol/l; p < 0.05]. Mean weight loss was not different among groups and there were no cases of hypercalcaemia. Secondary hyperparathyroidism was present in 10% in intervention- and 27% in placebo-group at 6 months (p < 0.05). Moreover, the effect of vitamin D loading dose was greater in patients with liver fibrosis (group and time interaction: p = 0.018) and with impaired renal function (group: p = 0.010; Figure 1).

Conclusion: This alternative supplementation regimen is effective and safe in vitamin-D-deficient bariatric patients. Moreover, patients with liver fibrosis and impaired renal function might benefit even more from this type of vitamin D supplementation. References [1] Cole AJ,et al. Nutr Clin Pract.2014 Dec;29(6):751–8 [2] Holick MF,et al. N Engl J Med.2007 Jul 19;357(3):266–81 [3] Luger M,et al. Trials.2015;16(1):328

Acknowledgement ML, BL, RM, RK, CK, MT designed the research. ML analyzed the data, performed statistical analyses and drafted the abstract. All authors approved the final version.

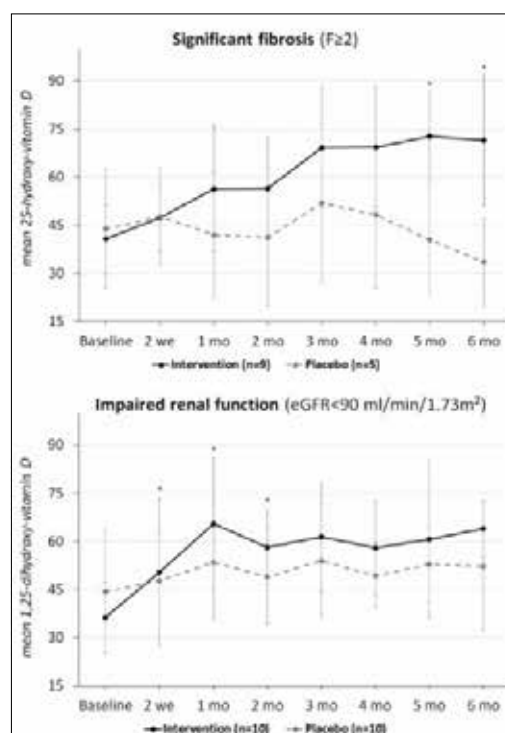


Fig. 1. Effect of vitamin D supplementation (loading dose in the first month with following maintenance dose) in patients with liver fibrosis and with impaired renal function. *p < 0.05

PO1.254

Complications after laparoscopic sleeve gastrectomy

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Background & Aims: Laparoscopic sleeve gastrectomy (LSG) is a feasible option in the management of morbid obesity with low morbidity and mortality. The most feared complication is the gastric fistula. The Aims: of this study were to examine the morbidity and mortality arising from LSG

as a primary procedure for weight loss and assess the impact of complications in the weight loss.

Material & Methods: We retrospectively reviewed the data of 159 patients who underwent LSG from 2009 to 2011, at a single medical center in Portugal. Patients were reassessed in consult over a 4 years period, for short and long-term postoperative complications and weight loss. Comparison of body mass index (BMI) and percentage of excess weight lost (%EWL) between the group with complications and the group without complications 1, 4, 24, 36, and 48 months after surgery was performed.

Results: One-stage LSG was performed in 159 patients. The major complication rate was 4.4% (7 of 159), including 2 leak (1.3%), 1 case of haemorrhage (0.6), 3 cases of postoperative abscess (1.9%), and 1 case of mesenteric thrombosis (0.6%). The approach of complications was individualized and included support medical treatment, surgical approach and / or interventional radiology and / or interventional gastroenterology. Patients were divided in two groups: group with complications and the group without complications. The mean initial BMI was similar between the two groups and there was an evolution of the % EWL during the 48 months also similar between the two groups. We found an increase in % EWL during the first 12 months, with an average loss of 72.5% in patients without complications and 70.7% in patients with complications. After 12 months the percentage of excess weight lost stabilized.

Conclusion: LSG is a relatively safe surgical option for weight loss as a primary procedure. In our sample the occurrence of complications after surgery had no impact on weight loss.

PO1.255

Improving the long term follow-up of bariatric surgery patients in the UK

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Background: Bariatric surgery is an appropriate treatment option for patients with severe and complex obesity. Although NICE CG183: Obesity states that patients receive lifelong follow-up and long term data must be collected, NHS bariatric centres are only commissioned to provide two years follow-up. After this, NICE recommends a shared care model for follow-up within primary care. Many primary care staff have little training in bariatric surgery patient management leaving patients potentially at risk if they do not have access to timely monitoring and action. Both NCEPOD (2012) and NHS England Obesity Clinical Reference Group (CRG) identified that there should be improvements in long term follow-up of UK NHS bariatric surgery patients. Objective To improve the long term follow-up of bariatric surgery patients.

Methods: A sub-group with a multi-professional membership was commissioned. The group discussed the requirements of long term follow-up and proposed possible models of shared care. The Obesity CRG which includes commissioners was consulted.

Results: Guidelines for bariatric surgery long term follow-up were produced. There are four models of care with annual reviews by: a) general practitioner (GP); b) GP and specialist bariatric dietitian; c) specialist centre d) GP and specialist team (joint). All models include annual nutritional monitoring, input of data into the National Bariatric Surgery Register and ability to refer back to the specialist centre.

Conclusion: The guidelines offer several options for the delivery of post-operative care of obesity patients. The different models can be chosen to fit the skill mix available in each locality. The guidelines will ensure that common outcome measures are recorded to provide some equality of care

across the country. References National Confidential Enquiry into Patient Outcome and Death. Too Lean a Service? A review of the care of patients who underwent bariatric surgery. London: Dave Terrey; 2012. National Institute for Health and Clinical Excellence (NICE) (2014) Obesity: identification, assessment and management of overweight and obesity in children, young people and adults. NICE. Available from: <http://www.nice.org.uk/guidance/CG189> (accessed 01.02.15)

PO1.256

Increased bioavailability of methadone following sleeve gastrectomy – a planned case observation

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Introduction: Occasionally, patients on methadone maintenance therapy are referred to bariatric clinics. Clinicians may be reluctant to approve these candidates for surgery for a number of reasons, including the largely unknown effects of bariatric surgery on the pharmacokinetics of methadone.

Aim: To evaluate the effect of sleeve gastrectomy on methadone pharmacokinetics.

Case: A 48-year-old morbidly obese Caucasian woman with a 27 year history of illicit drug abuse had gained 30 kg subsequently to starting methadone replacement therapy 120 mg/d. Her body weight (BMI) before surgery was 117.0 kg (46.3 kg/m²), which had decreased to 92.1 kg (36.4 kg/m²) one year after a sleeve gastrectomy.

Methods: Four series of 24-hour methadone concentration measurements were performed (preoperatively and 5 days, 1 month and 7 months postoperatively).

Results: Pharmacokinetic data of total (R- and S-methadone) methadone are presented in table 1. Pre- and post-dose concentrations (C_{min} and C_{max}) increased significantly after surgery, whereas the time from dosing to C_{max} (T_{max}) decreased. Total drug exposure (the 24 h area under curve, AUC₀₋₂₄) increased and reached a threefold baseline value 7 months postoperatively. The relative AUC of the active enantiomer R-methadone increased somewhat less than the total methadone. Genotyping revealed a heterozygous CYP3A5 *1/*3 genotype, conferring a faster than average metabolism of CYP3A substrates such as methadone. No overt signs of methadone toxicity were observed. The ECG QT interval (QTc) was 425 ms preoperatively and 435 ms postoperatively.

Conclusion: This case shows significant changes in the pharmacokinetics of methadone after sleeve gastrectomy. We propose that the surgical procedure caused a more rapid gastric emptying and increased the bioavailability of methadone, possibly by decreasing pre-systemic CYP3A metabolism. Although we would expect lower increases in the concentrations in subjects not having functional CYP3A5 enzyme (i.e. the majority of Caucasians), clinicians should beware the potential for increased drug effects of methadone after bariatric surgery. We recommend that serum concentrations be routinely measured pre- and postoperatively, and the dose be adjusted according to measurements and clinical assessment.

	Preoperatively (baseline)	5 days post- operatively	1 month post- operatively	7 months post- operatively
C_0 (nmol/l)	508	645	1166	1481
C_{24} (nmol/l)	945	1414	2128	2564
t_{max} (h)	2.5	1.5	1.5	1.0
AUC_{0-24} (% increase ¹)	-	41	143	213
$T_{1/2}$ (h)	29.3	36.5	37.1	37.2

Tab. 1. Pharmacokinetic variables of methadone in a woman undergoing sleeve gastrectomy

PO1.257

Hypomagnesemia and metabolic syndrome in obese patients submitted to bariatric surgery: A 2-year follow-up study

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Background: Magnesium is an essential enzyme cofactor playing a crucial role in many cellular functions, including protein and DNA synthesis, glucose and lipid metabolism, neuromuscular excitability, thermogenesis and maintenance of the immune and hormonal system. Several evidence suggests a relationship between hypomagnesemia and insulin resistance, particularly in obese patients. However, its association with metabolic syndrome (MS) has been controversial.

Objectives: The present study Aims: to assess the prevalence of hypomagnesemia in obese patients and its association with MS over two years of follow-up after bariatric surgery (BS).

Material/Methods: We performed a retrospective longitudinal study of 1184 obese patients undergoing BS between January/2010 and July/2014 at our centre. Patients who had no record of MS criteria or therapy were excluded. We used the MS criteria recommended by the International Diabetes Federation. Hypomagnesemia was defined considering serum magnesium values < 1.55 mEq/L. Statistical analysis was performed using Chi-square and Nonparametric McNemar tests. A two-tailed $p < 0.05$ was considered statistically significant.

Results: A total of 723 patients were included, 629 women (87.0%) and 94 men (13.0%). Of these, 490 (67.8%) had MS, observing an hypomagnesemia frequency of 28.5% compared to 21.2% in patients without MS ($P = 0.006$). At 12 months postoperatively, we found a statistically significant difference between the frequency of hypomagnesemia in patients with MS (41.1%) and without MS (18.9%) ($p < 0.01$). At 24 months postoperatively, 31.3% of patients with MS had hypomagnesemia, in contrast to only 22.1% of patients without MS ($p = 0.305$).

Conclusion: Almost 30% of the obese population analyzed had hypomagnesemia. We observed a higher frequency of hypomagnesemia in patients with MS, statistically significant at 0 and 12 months after surgery. As magnesium deficiency is a strong predictor of the development of insulin resistance, further studies are needed to evaluate the cost-effectiveness of its determination and replacement in these patients, and its impact on preventing the regression of MS after BS.

PO1.258

Continuous glucose monitoring as a screening tool for hypoglycaemia after bariatric surgery

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Life-threatening severe hypoglycaemic episodes have been described after bariatric surgery, but the clinical significance of low glucose values observed after a glucose challenge is debated. The Whipple triad, which combines symptoms and low glucose value, is the recommended diagnosis criteria, which may be flawed because of symptoms unawareness or misperception. We performed a CGM in patients after bariatric surgery (142 with symptoms and 25 without), and compared patients with HYPO (CGM value < 60 mg/dl) to those without (NOHYPO). Patients with HYPO spent significantly more daily time < 60 mg/dl (3.6 ± 4.0 vs. $0.2 \pm 0.6\%$ of daily time, $P = 0.0000$), had higher max interstitial glucose values and glucose variability. Adrenergic, and neuroglucopenic symptoms were as frequent in HYPO as in NOHYPO patients. The Sigstad score was higher in HYPO. We conclude that a "syndromic" CGM profile (increased time below 60 mg/dl, higher max interstitial glucose values and glucose variability) exists in patients after bariatric surgery, and is likely pathological. We suggest that CGM be used for screening patients because of the lack of sensitivity and specificity of the symptoms.

PO1.259

The need for intensive nutritional care after Bariatric Surgery: Is Mini Gastric Bypass at fault?

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Severe nutritional complications after bariatric surgery remain poorly described. Moreover, the drop-out rate of published series is often high, in studies which are generally performed in high-volume centers by experienced teams which may underestimate the real rate of late complications after bariatric surgery. The aim of this case series was to identify specific factors associated with nutritional complications and to characterize nutritional disorders after bariatric surgery. We retrospectively reviewed all persons referred to the Clinical Nutrition Intensive Care Unit of our university hospital after bariatric surgery from January 2013 to June 2015. Twelve persons who required artificial nutrition supplies i.e. enteral or parenteral nutrition were identified. Seven persons underwent a "one anastomosis gastric bypass" (OAGB) or "mini gastric bypass", 2 underwent a Roux-en-Y gastric bypass, 2 had a sleeve gastrectomy and 1 had an adjustable gastric band. Most nutritional deficiencies occurred after a surgical complication. Our case series suggests that OAGB could over-expose subjects to severe nutritional complications requiring intensive nutritional care and therefore cannot be considered as a "mini" bariatric surgery. Moreover, most of the participants had vitamin A deficiency after OAGB suggesting that OAGB may be associated with a significant malabsorption. Even if OAGB is often considered as a simplified surgical technique, it obviously required as the other standard bariatric procedures a close follow-up by experimented teams aware of its specific complications.

PO1.260

Totally robotic gastric bypass using modified Lonroth technique

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Background: Robotic Bariatric Surgery is a good option for the super obese where laparoscopy demands challenging technical skills. Gastric bypass can be difficult due to inability of the robot to work in two quadrants at the same time. Lonroth technique of gastric bypass involves a totally supracolic surgery where all anastomosis are done in one quadrant only.

Methods: We have done 78 robotic gastric bypass surgeries using the modified Lonroth technique. The robot is docked above the head of the patient in the midline. Camera port is placed supra umbilically. Two ports are placed on the left side of the patient and one port on the right side of the patient. An assistant port is placed between the camera port and right sided robotic port for use of stapler. Gastric pouch is made first followed by the gastrojejunostomy that is a four layered sutured anastomosis. Jejunum is then performed followed by a leak test and then the jejunum is divided. A 150 cm biliopancreatic limb and a 75 cm alimentary limb is finally obtained. Mesenteric and Petersen's defects are then closed.

Results: All patients had a successful robotic procedure. Mean time taken in the first 5 cases was 130 minutes. This reduced to a mean of 95 minutes in the last five cases. There were no intraoperative or post operative complications.

Conclusions: While a hybrid technique of partly laparoscopic and partly robotic gastric bypass has been done at many centres, we feel using the modified Lonroth technique, a totally robotic gastric bypass surgery fully utilizes the potential of robotic bariatric surgery.

PO1.261

Use of Intra-gastric Balloon for preoperative weight loss

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Background: Intra-gastric Balloon (IGB) is a recognised treatment for obesity which is used for temporary weight loss. It is safe, relatively cheap, reversible and minimally invasive. Since 2013, we have been using IGB in a multidisciplinary setup for pre-operative weight reduction in super-obese patients prior to their definitive bariatric procedure. We have also used it to achieve targeted weight loss in patients awaiting breast reconstruction surgery or joint replacement surgery.

Objectives: The aim of the study was to assess the amount of weight loss achieved in these super-obese patients with IGB and to find out the number of patients who were successfully optimised for the definitive surgery. We also tried to find out the complications associated with IGB.

Methods: Between December 2013 and September 2015, 16 patients underwent insertion of IGB and completed at least six months of follow-up. We retrospectively collected our data from theatre records, medical notes and NSBR database.

Results: 16 patients (14 females and 2 males) were included in the study with a mean age of 49.06 years with a preoperative body weight of 158.71 kg (range: 107- 212 kg) and a preoperative BMI of 58.19 (range: 40.4- 72). 4 (25%) patients needed early removal of the IGB- 3 in the first week for nausea and vomiting and 1 in the sixth week for upper GI bleeding. The mean weight loss in the rest of the 12 patients was 13.11 kg with a mean Excess Weight Loss of 16.67%. Of the 12 patients who had the IGB for 4-6 months, 7 (58.3%) managed to lose enough weight to proceed to their definitive surgery. Nausea and vomiting were the commonest complication occurring in 6 (37.5%) patients. The other complications were balloon rupture in one patient and upper GI bleeding in another.

Conclusion: We have used IGB in a multi-disciplinary setup to initiate weight loss in this difficult category of super-obese patients. The weight loss achieved in these patients are comparable to those reported in litera-

ture. Nausea and vomiting is a common side-effect of this procedure and we need to manage this aggressively to improve our results.

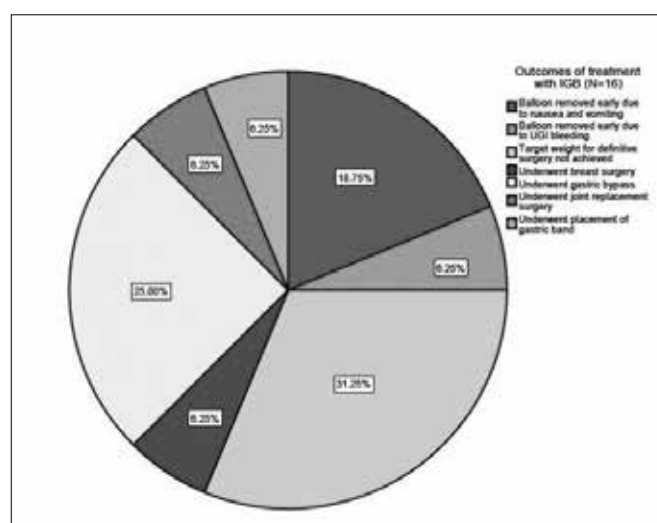


Fig. 1. Outcomes of treatment with IGB

PO1.262

Liver stiffness and glycolipid metabolism in morbid obese patients: Effects of marked weight loss obtained by Laparoscopic Sleeve Gastrectomy

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Objective: fatty liver occurs mainly in obese patients, burdened also by a state of insulin resistance. The activation of a cascade of inflammatory processes leads to a different degree of fibrosis.

Aim: the aim of the study is to evaluate the impact of Sleeve Gastrectomy (SG) on glucose and lipid metabolism, degree of fibrosis assessed by technical elastography ARFI (Acoustic Radiation Force Impulse) and liver enzymes.

Methods: 45 patients were recruited (37 F), aged between 18 and 62 years. All patients underwent to laboratory tests, OGTT, abdominal ultrasound with ARFI before and 6 months after SG. Liver stiffness was calculated by Shear Wave Velocity (m/sec) and measured in kPa. During surgery liver biopsy was performed in all subjects.

Results: before SG, weight and BMI were respectively 122.5 ± 20.3 kg and 44.12 ± 7.1 kg/m². Six months after surgery, weight and BMI decreased to 91.31 ± 14.71 kg and 32.64 ± 5.41 kg/m². Before surgery, 7 patients were affected by type 2 diabetes, 11 by Impaired Glucose Tolerance (IGT), 17 by dyslipidemia, 36 by steatosis (6 by mild steatosis, 23 moderate, 7 severe). Before SG the ARFI was 6.87 ± 10.8 kPa and transaminases AST 23.82 ± 2.10 U/L, ALT 28.77 ± 15.65 U/L. After SG only 1 patient was still diabetic, no patient showed IGT, 9 remained dyslipidemic, 17 showed steatosis (14 mild, 2 moderate and 1 severe). After SG ARFI reduced to 4.13 ± 5.62 kPa (P < 0.005) and AST at 16:41 ± 4.98 U / L, ALT at 14:31 ± 28.6 U / L (p < 0.0001).

Conclusions: The SG has proven effective for the treatment of obesity and its metabolic complications showing an important reduction in the ARFI suggestive of a reduced degree of hepatic fibrosis present in these patients.

Nutritional status of patients at 6 months after laparoscopic sleeve gastrectomy

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Background and Aim: Currently, laparoscopic sleeve gastrectomy (LSG) proves to be a very effective and safe treatment choice for morbidly obese patients. However, one of the most important things to consider in the long-term follow up are the nutritional deficiencies that could appear. The aim of this study was to investigate the weight loss and nutritional status of patients at 6 months after the LSG, monitored in the newly established obesity center in our hospital.

Material/Method: We followed patients who underwent LSG between April 2012 and December 2014. We assessed before surgery and at 6 months after surgery: weight, height, and we calculated body mass index (BMI), total serum protein level, serum albumin, hemoglobin, serum iron level, serum calcium and magnesium level, vitamin D, vitamin B12 and folic acid levels. All patients were recommended to take the same vitamin and mineral supplements after surgery.

Results: We investigated 64 patients (22 men and 42 women), age 40.7 ± 11.3 years, with BMI before surgery of 44.5 ± 6.24 kg/m². Before surgery, the only significant deficiency was in vitamin D (21.37 ± 8.41 ng/mL). At 6 months after surgery, the weight loss was significant, with BMI of 33.22 ± 7.19 kg/m² ($p < 0.001$) and a percentage of excess weight loss of 55.33 ± 19.31 . At 6 months after surgery, we observed significant decreases in hemoglobin level (from 14.13 ± 1.4 g/dL to 13.7 ± 1.16 g/dL, $p = 0.004$), serum albumin level (from 3.7 ± 0.3 g/dL to 3.6 ± 0.3 g/dL, $p < 0.001$) and serum iron level (from 108 ± 7.4 µg/dL to 106 ± 4.45 µg/dL, $p = 0.01$), no other significant decreases, and an increase in vitamin D level (to 30.31 ± 2.67 ng/mL), but without statistical significance ($p > 0.05$).

Conclusions: At six months after LSG, patients lost 55% of excess weight, and presented an increase in vitamin D levels. Although vitamin B12, folic acid, calcium, magnesium and total protein levels were in normal range, we saw a decrease in hemoglobin, albumin and iron levels, which requires further attention.

Laparoscopic Sleeve Gastrectomy: Impact on Weight Loss and Body Mass Index over Five Years

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Background/Aims: Laparoscopic sleeve gastrectomy (LSG) is an increasingly performed surgery for morbid obesity worldwide. Being a fairly novel procedure, LSG lacks long-term data, but short-term and intermediate results suggest its effectiveness at inducing and maintaining weight loss.

Objectives: We report our experience with LSG in terms of its impact on weight loss and body mass index (BMI) over five years of postoperative follow-up.

Material/Methods: We retrospectively reviewed the medical records of 431 patients who underwent LSG at a Portuguese Tertiary Hospital from January 1, 2006 to June 30, 2015. Weight and BMI outcomes were extracted at baseline, one, three, six, twelve and eighteen months and two, three, four and five years postoperatively. Results: are presented as mean \pm standard deviation.

Results: 83.3% of the patients were female and the mean age was 44.6 ± 10.6 years (Δ 20–70 years). At baseline, the mean weight and the BMI were 120.8 ± 23.2 Kg (Δ 73–242Kg) and 45.8 ± 7.3 Kg/m² (Δ 30.4–81.8Kg/m²), respectively. Postoperative excess weight loss was 9.9% at one

month (weight 108.8 ± 21.2 Kg, BMI 41.3 ± 6.9 Kg/m², $n = 398$), 17.8% at three months (weight 99.3 ± 19.4 Kg, BMI 37.7 ± 6.2 Kg/m², $n = 384$), 24.6% at six months (weight 91.1 ± 17.8 Kg, BMI 34.6 ± 5.9 Kg/m², $n = 380$), 29% at twelve months (weight 85.8 ± 18.7 Kg, BMI 32.7 ± 6.3 Kg/m², $n = 329$), 28.7% at eighteen months (weight 86.1 ± 18.2 Kg, BMI 32.7 ± 6.3 Kg/m², $n = 248$), 27.1% at two years (weight 88.1 ± 19.4 Kg, BMI 33.3 ± 6.8 Kg/m², $n = 196$), 24.1% at three years (weight 91.7 ± 20.6 Kg, BMI 34.5 ± 7.1 Kg/m², $n = 120$), 23.6% at four years (weight 92.3 ± 19.7 Kg, BMI 35.1 ± 6.5 Kg/m², $n = 79$) and 25.7% at five years (weight 89.7 ± 20 Kg, BMI 34.2 ± 6.5 Kg/m², $n = 54$).

Conclusion: Our study shows that mean weight and BMI decreased considerably during the first year postoperatively and remained lower than basal values throughout follow-up. This reinforces the effectiveness of LSG at inducing and maintaining weight loss in the short and intermediate-terms and suggests that, albeit less significantly, LSG looks promising at maintaining weight loss in the long-term.

Vitamin D Deficiency and Obesity: Retrospective Evaluation of Weight Loss According to Vitamin D Levels

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Background: It seems to exist a causal relationship between vitamin D (vitD) deficiency and obesity but the nature of this relationship remains controversial. Objectives We aimed to assess the relation between weight loss 12 months after bariatric surgery and preoperative vitamin D levels.

Material & Methods: We performed a retrospective study of 1184 obese patients undergoing bariatric surgery between January/2010 and June/2014 at our centre. Only patients with baseline and post-surgery vitD determinations were included. These patients were divided into three classes according to the vitD baseline levels: normal (vitD ≥ 30 ng/mL); insufficient (vitD 20–29 ng/mL) and deficient (vitD < 20 ng/mL). Results: Follow-up was completed in 474 patients, 70 (14.8%) of whom were men and 404 (85.2%) were women. At baseline, 5.3% had normal values of vitD, 18.8% had vitD insufficiency and 75.9% vitD deficiency. The three groups were similar in what concerns to gender ($p = 0.635$), age ($p = 0.963$), weight ($p = 0.912$), waist circumference ($p = 0.240$), hip circumference ($p = 0.256$) and body mass index ($p = 0.341$). Patients were proposed to one of the three bariatric surgery available techniques – adjustable gastric banding (AGB), gastric bypass (GB) and sleeve gastrectomy (SG) – with similar distribution between the three classes of vitD ($p = 0.169$). Weight loss after surgery was statistically significant throughout the three vitD classes: a weight reduction from 112.88 ± 18.105 kg to 79.15 ± 11.179 in the group with normal vitD ($p < 0.001$), from 117.30 ± 21.957 kg to 79.71 ± 15.064 kg in the group with vitD insufficiency ($p < 0.001$), and from 116.36 ± 17.899 kg to 80.81 ± 15.165 kg in the group with vitD deficiency ($p < 0.001$). All three types of bariatric surgery led to significant weight loss ($p < 0.001$) that was not affected by the initial vitD class ($p = 0.167$). Conclusion: A significant weight loss was found with the three types of surgery at 12 months of follow-up regardless of baseline vitD status.

Severe and recurrent hypoglycemia after gastric bypass surgery – we must keep alert for the diagnosis

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Background: Bariatric surgery and its exponential growth in the last years led to the recent recognition of hypoglycemia after gastric bypass, an underdiagnosed clinical situation. The differential diagnosis with late dumping syndrome is important, as some of the symptoms can be similar between these two entities.

Case: Female, 45 years old, with morbid obesity (body mass index [BMI] 43.75 kg/m²), obstructive sleep apnea syndrome, venous insufficiency and depressive syndrome, who underwent to Roux-en-Y gastric bypass in 2012. Sixteen months after surgery she began to experience worsening postprandial hypoglycemia (2–3 hours after meals), with adrenergic and neuroglycopenic symptoms. Two of those episodes were associated with seizures requiring hospital admission. The symptoms improved after carbohydrate intake. Plasma sampling during the episodes revealed glucose 33 mg/dL, insulin 10.5 µU/mL and C-peptide 5.11 ng/mL. Two hours after an oral glucose tolerance test (OGTT) the patient experienced a symptomatic hypoglycemia of 32 mg/dL, which was preceded by an increase in serum insulin (215.9 µU/mL) and C-peptide (21.06 ng/mL) levels at 60 minutes. She also performed a mixed-meal study that revealed an increased level of insulin (291.8 µU/mL) and C-peptide (21.40 ng/mL) at 60 minutes followed by a symptomatic hypoglycemia of 49 mg/dL at 120 minutes. Abdominal ultrasound and pancreatic MRI did not reveal any pancreatic lesion. There was no hypoglycemia resolution after diet modification, fiber supplementation and acarbose treatment. Currently she has a BMI of 26.7 kg/m² and maintains postprandial hypoglycemia episodes 1–2 times per week that profoundly affect her social and professional activities. After discussing her clinical situation in AMTCO and Hepato-biliary Surgery Group, pancreatic resection was proposed, with intraoperative selective arterial calcium-stimulated test to assess the extent of surgery.

Conclusion: This case report highlights the importance of identifying post-gastric bypass hypoglycemia, a challenging diagnosis that can cause severe disability.

Improvement in patient-assessed quality of life, eating behavior, and sexual function after 26 weeks of naltrexone/bupropion compared with usual care

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Prolonged-release naltrexone/bupropion (NB) is approved in the US and EU for chronic weight management as an adjunct to diet and increased physical activity in overweight/obese adults with an initial body mass index (BMI) of ≥30 kg/m² or ≥27 kg/m² in the presence of at least one weight-related comorbidity. This analysis of the NB-404 trial examined patient-reported outcome (PRO) data after 26 weeks of open-label treatment. Subjects were randomly assigned to NB plus a commercially-available telephone/web-based lifestyle intervention program (N = 153) or usual care (UC; periodic diet/exercise advice; N = 89). To continue NB treatment subjects were required to exhibit ≥5% weight loss after 16 weeks (consistent with NB prescribing information), with no sustained increase in blood pressure. Impact of Weight on Quality of Life–Lite (IWQoL-Lite), the Binge Eating Scale (BES), and the Arizona Sexual Function Scale

(ASEX) were assessed at baseline (BL), Week 16 and Week 26. Analyses were performed on subjects who remained on treatment through Week 26: NB, n = 71; UC, n = 82, 84% female, 80% white, mean age 48 y and mean BMI 36 kg/m². At Week 26, NB elicited greater weight change (9.5% vs. -0.9%, p < 0.001) and improvement in all 3 PROs vs. UC. IWQoL-Lite total score (BL: 67 NB, 64 UC) improved with NB (+16.4 [1.5]; least squares mean change [SE]) vs. UC (-1.0 [1.4]; p < 0.001); significant improvement was also seen in all 5 subdomains). At BL, 34% of NB subjects and 44% of UC subjects met the ASEX criteria for sexual dysfunction; at Week 26, over half (58%) of these NB subjects no longer met such criteria, compared to 19% of UC subjects. BES total score (BL: 15 NB; 16 UC) was also significantly improved with NB (-6.8 [0.7]) vs. UC (+1.1 [0.7]; p < 0.001). In subjects with moderate/severe BES scores at BL (32% of NB, 41% of UC subjects), categorical improvement was observed in 91% of these NB subjects vs. 18% in UC. Treatment with NB, in a manner consistent with clinical practice, was associated with improved weight-related quality of life, control of eating, and sexual function. Larger double-blind studies to confirm these outcomes are warranted.

Prolonged-Release Naltrexone/Bupropion Combination Therapy Had no Effect on Adverse Events of Depression or Suicidal Ideation: A Pooled Analysis from the Contrave Obesity Research Program

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Prolonged-release naltrexone 32 mg/bupropion 360 mg (NB) is approved in the US and EU for chronic weight management as an adjunct to a reduced-calorie diet and increased physical activity in obese/overweight adults. Phase 3 studies demonstrated significantly greater weight loss with NB vs placebo in the setting of both standard and intensive lifestyle modification counseling. As some centrally acting obesity therapies have previously been associated with psychiatric adverse events (PAEs), data from the combined studies were examined to assess the incidence of these events. The safety of prolonged-release naltrexone (studied at doses of 16, 32 and 48 mg)/bupropion (360 mg) was evaluated in a combined analysis of 1515 Placebo (PBO) and 3239 Total-NB (all doses) subjects from five double-blind, placebo-controlled trials (subjects taking ≥1 study drug tablet; ≥1 investigator contact). Key exclusion criteria included: serious psychiatric illness, current severe major depression or active suicidal ideation, and suicide attempt or pharmacologic treatment of psychiatric disorder in previous 6–12 months. Baseline characteristics included mean age 45–46 y; weight 100 kg; BMI 36 kg/m²; 82%–83% female; 77%–79% Caucasian; history of depression: 10.9%–12.7%; history of anxiety: 3.9%–4.2%. There was no evidence of a higher rate of depression-related PAEs (1.9% Total-NB vs. 2.7% PBO, Relative Risk (RR) = 0.72, 95% Confidence Interval [0.48, 1.07]) or suicidal ideation (Total-NB < 0.1% vs. PBO 0.2%; RR = 0.16 [0.02, 1.42]) with Total-NB vs. PBO. Total-NB subjects experienced more anxiety- and sleep disorder-related PAEs vs. PBO (5.0% vs. 3.3%, RR = 1.62 [1.18, 2.22] and 11.6% vs. 7.9%, RR = 1.63 [1.33, 2.00], respectively). Depression-, anxiety-, and sleep-disorder-related PAEs were mild, transient and tended to occur early in the trial. PAE-induced discontinuations were similar between groups. The safety/tolerability profile of NB was consistent with its individual components; the most common adverse events were nausea, constipation, headache, vomiting, insomnia, dry mouth, diarrhea, and dizziness. NB was generally well-tolerated, and was not associated with increased incidences of depression or suicidal ideation.

Long-term efficacy of naltrexone/bupropion, administered as recommended in clinical practice*Halseth, A.¹; Shan, K.¹; Chen, S.²*¹Orexigen Therapeutics, Inc.²Takeda Pharmaceuticals USA

Prolonged-release naltrexone 32 mg/bupropion 360 mg (NB) is approved in the US and EU for chronic weight management as an adjunct to diet and physical activity. Phase 3 studies demonstrated significantly greater weight loss with NB vs. placebo in the setting of both standard and intensive lifestyle modification counseling. This study compared the effects of NB combined with a commercially-available telephone/web-based lifestyle intervention program (Group 1) with effects of usual care (Group 2; periodic diet and exercise advice), in overweight/obese subjects over 26 weeks, followed by a 1-year extension during which all subjects received NB and lifestyle intervention. To continue NB treatment subjects were required to exhibit $\geq 5\%$ weight loss after 16 weeks (consistent with NB prescribing information), with no sustained increase in blood pressure (BP). The primary endpoint was weight change at Week 26 (reported previously). This analysis focuses on Week 78 data (total NB treatment duration was 78 weeks for Group 1 and 52 weeks for Group 2). The overall randomized population (Group 1 N = 153, Group 2 N = 89) was 84% female, 78% white, with mean age of 47 y and BMI of 36 kg/m². Similarly, the Week 78 per protocol (PP) population (n = 83) was 81% female, 87% white, 48 y, with BMI of 36 kg/m². Major reasons for NB discontinuation were $< 5\%$ weight loss after 16 weeks of treatment (24%) and adverse events (21%). At 78 weeks, least squares mean change in weight (SE) was similar between PP Group 1 and Group 2 subjects (-9.4 [1.1]% and -10.7 [1.5]%). Pooling Groups 1 and 2, 72%, 46%, and 25% of subjects achieved $\geq 5\%$, 10%, and 15% weight loss at Week 78. Mean systolic/diastolic BP was reduced 1–2 mmHg at Week 78, compared to baseline. The adverse event profile was similar to Phase 3 trials. In this study NB, when combined with lifestyle modification and used as recommended in clinical practice, resulted in approximately 10% mean weight loss which was sustained for up to 78 weeks.

PO 2 – Basic Science and Experimental Approaches II

PO2.001

Increased diet-induced-thermogenesis after consumption of fish protein in combination with high glycemic index carbohydrates compared with meat protein – a randomized crossover study

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Introduction: Proteins have a higher diet-induced-thermogenesis (DIT) than fat and carbohydrates. Furthermore, proteins from different sources may affect DIT differently and mice studies have shown that type and amount of carbohydrates also affect the thermic response of protein. Therefore we investigated the acute effects of fish-protein versus meat-protein in combination with different glycemic index (GI) carbohydrates on DIT, respiratory quotient (RQ), glucose, insulin and C-peptide.

Methods: We included 25 healthy overweight men and women (mean \pm SD age: 28.8 \pm 7.6y, BMI: 27.5 \pm 1.5kg/m²) in this randomized crossover study. Four iso-caloric meals with identical macronutrient distribution were tested (Energy-%: 41 carbohydrate, 34 fat, 25 protein); salmon+mashed potatoes, salmon+pasta, veal+mashed potatoes and veal+pasta. Energy expenditure was measured by indirect calorimetry using a ventilated hood system at baseline and every half hour until an ad libitum buffet-style lunch was served 3.5 hours later. Blood samples were drawn at baseline and every 20 minutes. Repeated measurements were analyzed using linear mixed models including a time-treatment interaction. AUC was also analyzed using linear mixed models including treatment.

Results: We found a higher DIT after salmon+mashed potatoes compared to salmon+pasta ($p = 0.001$) and veal+pasta ($p = 0.049$). Generally, RQ was higher after meals with mashed potatoes compared to pasta independent of protein source. Glucose peaks were lower after salmon meals compared to veal in combination with the same carbohydrate source. This was also reflected in lower peaks of insulin and C-peptide for salmon meals compared to meals with veal, dependent of carbohydrate source.

Conclusion: Salmon+mashed potatoes increased DIT compared to the other meals. This result indicates that DIT is sensitive to GI of carbohydrates after intake of proteins from salmon, but not from veal. Also, the salmon protein meals seemed to induce lower peaks of glucose, insulin and C-peptide compared to the veal protein meals dependent of carbohydrate source.

Acknowledgements: The study was founded by the Norwegian Seafood research fund. We are grateful to the kitchen and laboratory staff at NEXS for their assistance.

PO2.002

Smelling attenuation promotes weight loss in obese non diabetic adults

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Background: Smelling plays a central role in the metabolic cycle: Receptors of metabolic related hormones (ghrelin, leptin, etc.) are found in the olfactory organ. Food cues, including smell, increase the quantity of food consumed, particularly among overweight persons.

Objective: To examine the safety and efficacy of a device that attenuates smelling, on weight reduction and eating habits.

Materials/Methods: A 12 week randomized, placebo controlled trial of obese individuals (30.0 < BMI < 42.9 kg/m²). Study group subjects inserted into each of their nasal cavities, for at least 5 hours daily, an innovative silicone apparatus (Figure 1) that attenuates smelling while enabling unobstructed breathing. Subjects in the control group administered 2 physiological saline drops once daily. Both groups received dietary consultation every two weeks.

Results: Thirty-seven completed the study arm, mean age 52.0 \pm 10.0 years; 16(43%) were aged <51 years. Twenty-eight completed the control arm, mean age 49.6 \pm 10.5 years, 13(46%) were <51 years. Study group participants lost a mean of 6.6% (6.8kg) of their body weight, and control group participants 5.7% (5.9kg), $p = 0.34$. Among participants aged <51, mean weight losses were 7.7% (8.3kg) and 4.0% (4.2kg) for the respective groups, $p = 0.01$. Among those aged >51, mean weight losses were 5.7% (5.7kg) and 7.0% (7.3kg) respectively, $p = 0.24$. BMI decreased significantly more in the study than placebo group, for the <51 years but not for the >51 years subgroup (Figure 2). For those <51 years, weight loss of >5% occurred in 12/16(75%) and in 4/13(31%) of the study and control groups respectively, $p = 0.017$; weight loss >10% occurred in 3/16(19%) and in 0/13(0%) of the respective groups, $p = 0.1$. Eighteen (49%) of the study group and 5(19%) of the control group reported consuming less sugar than before the study, $p = 0.015$. No serious adverse events occurred.

Conclusion: This pilot study demonstrated significant weight reduction and change in food preferences among obese adults aged <51 who used a self administered apparatus that attenuates smelling.

PO2.003

Effects of polydextrose on gastric peptides in healthy normal weight and overweight women when consumed during a breakfast meal

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Background/Aims: Substantial evidence indicates that polydextrose (PDX) induces changes on gastric peptides in normal weight [1] and obese [2] women. This is the first study to assess the effects of PDX on gastric peptides in women only.

Objectives: The study was acute, randomized, double-blinded and crossover in design in order to assess the effects of a breakfast containing 12.5 g of PDX (1600 kJ) versus an isocaloric control breakfast on gastric peptides in 32 women (27.4 \pm 6.6 yrs; 25.9 \pm 2.7 kg/m²).

Material/Methods: The levels of cholecystokinin (CCK), ghrelin, glucagon-like peptide 1 (GLP-1), and peptide tyrosine-tyrosine (PYY) were assessed before (0 min), and 30, 60, 90, 150 and 240 min after breakfast. CCK and ghrelin were analysed by Radioimmunoassay (RIA), and GLP-1 and PYY by Enzyme-Linked Immunosorbent Assay (ELISA).

Results: were expressed as Areas Under the Curve (AUC). A mixed model was applied to analyse AUCs having Conditions (two) and Time as a fixed factor and having Subject, Cohort (four), and Treatment Day (four) as random factors.

Results: The mean AUC of GLP-1 for the breakfast containing 12.5 g of PDX was significantly higher than the isocaloric control breakfast ($P = 0.02$, mean AUC 463 \pm 306 mm.min and 331 \pm 254 mm.min, respectively). No other significant effects were found for the gastric peptides.

Conclusion: PDX consumed as part of the breakfast significantly increased GLP-1 levels. This may be useful to prevent snacking behaviour and energy intake.

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PO2.004

The effect of diet on weight loss and body composition after ileal transposition

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Background: Bariatric surgery is considered the most effective treatment for obesity, but the underlining mechanisms of weight loss after surgery is not clearly understood.

Objective: To study the effect of the 3 macronutrients on food intake, and weight loss following ileal transposition (IT).

Materials/Methods: Male Lewis rats underwent ileal transposition or sham surgery and were given high fat (HF), high protein (HP) or high carbohydrate (HC) diet. Food intake and body weight were measured daily. Dissectable body fat and organs weights were measured. Serum levels of GIP, PYY, GLP-1 and neurotensin were assayed by radioimmuno assays.

Results: IT rats lost significantly more weight than did sham rats eating the same diet ($p < 0.0001$). HF groups lost the most weight after surgery ($p = 0.001$). HF rats ate significantly less amount of food than HC and HP did after surgery ($p < 0.02$ for IT and ($p < 0.001$) for control). Dissectable body fat was significantly reduced in each IT group ($p < 0.0001$) compared to sham – the difference was the greatest between the HF groups: 45%. IT groups had lowered GIP ($p < 0.01$ for HC and HF but not for HP), higher PYY ($p < 0.0001$), GLP-1 ($p < 0.0001$) and neurotensin ($p < 0.0001$) levels.

Conclusions: High fat and high protein diets support weight loss most effectively after IT surgery. Changes are probably caused by the over-stimulation of the transposed ileal segment and by the modified hormone profile (amplified ileal brake phenomenon).

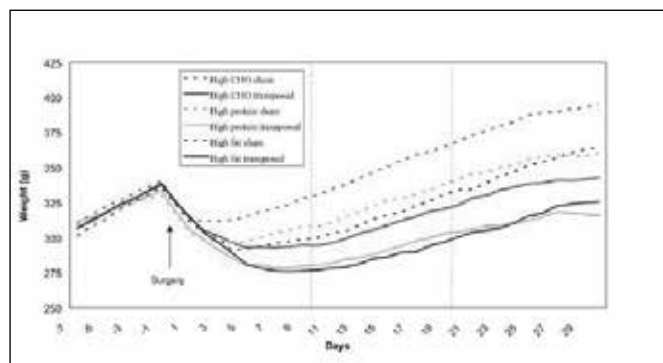


Fig. 1. Daily body weight

IT rats lost significantly more weight than did sham animals ($p = 0.004$) HC groups gained more weight than the other two groups with both IT and sham surgery ($p = 0.01$).

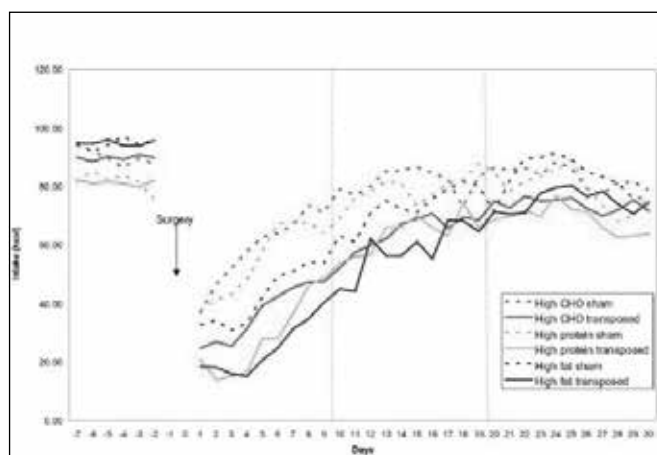


Fig. 2. Daily food intake

Pre-surgery: HP diet was consumed significantly less ($p < 0.001$) than was HC and HF. Post-surgery: control groups ate significantly more than did ileal transposed groups ($p < 0.0001$). HC rats ate the most, followed by HP and HF during the first 10 days after surgery.

PO2.005

Effects of polydextrose on the subjective feelings of appetite in women during the Satiety and Satiety periods when consumed as part of a breakfast or as a mid-morning snack

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Background/Aims: Polydextrose (PDX) may induce changes in appetite [1,2]. A new method has been proposed to analyse the subjective feelings of appetite when they are assessed by visual analogue scales (VAS) during the Satiety (pre- to post-meal) and Satiety (post-meal to subsequent meal) periods [1,3]. This is the first study on the effects of PDX on appetite to be conducted only in women.

Objectives: Hunger, Fullness, Desire to Eat, and Prospective Food Consumption were assessed during the Satiety and Satiety periods in 32 women (27.4 ± 6.6 yrs; 25.9 ± 2.7 kg/m²) in an acute, randomized, double-blinded and crossover study. Four conditions were tested: an isocaloric placebo versus 12.5 g of PDX mixed with yogurt and consumed as part of a breakfast or a mid-morning snack. All four conditions had the same calorie load of 1600 kJ before the ad libitum lunch.

Material/Methods: VAS results were expressed as incremental areas under the curve (iAUC) for both Satiety and Satiety periods [1]. A mixed model was applied to analyse the results having Conditions (four) and Time as a fixed factors and having Subject, Cohort (four), and Treatment Day (four) as random factors.

Results: PDX reduced Hunger by 31.4% ($P = 0.01$) during the Satiety period when consumed as part of the mid-morning snack. There were no significant changes when PDX was consumed as part of the breakfast, likely due to the interference with other nutrients.

Conclusion: PDX effectively reduced hunger feelings in women when consumed as a mid-morning snack, which may be beneficial for compliance of a restricted diet to prevent snack intake.

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PO2.006

Protein from salmon can potentially reduce appetite sensations to a greater extent than protein from veal

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Background: Proteins are known to increase satiety compared to both carbohydrates and fat. However, little is known on how protein from different sources affects appetite and how the type of carbohydrate may interact. Therefore, we investigated the acute effects of meals containing proteins from fish versus meat in combination with high and low glycemic index (GI) carbohydrates, on subjective appetite sensation, energy intake and ghrelin.

Methods: We included 25 healthy overweight men and women (mean \pm SD age: 28.8 ± 7.6 y, BMI: 27.5 ± 1.5 kg/m²) in this randomized cross-over study. Four iso-caloric meals with an identical macronutrient and fiber content were tested (Energy-%: 41 carbohydrate, 34 fat, 25 protein); salmon+mashed potatoes, salmon+pasta, veal+mashed potatoes and veal+pasta. Subjective appetite sensations were measured using visual analogue scales (VAS) at baseline and every half hour until the ad libitum lunch was served 3.5 hours later. Blood samples were drawn at baseline and every 20 minutes. Repeated measurements were analyzed using linear mixed models including a time-treatment interaction. Energy intake and palatability were analyzed using linear mixed models including treatment.

Results: Participants had lower prospective food consumption, were more satiated and filled after salmon+mashed potatoes compared to veal+pasta ($p < 0.05$). Palatability was, however, lower for salmon+mashed potatoes ($p < 0.05$). After adjusting for palatability, only prospective food consumption was still lower after salmon+mashed potatoes ($p < 0.05$). Ghrelin levels were generally suppressed after the salmon compared with the veal meals. However, there were no differences in ad libitum energy intake ($p = 0.98$).

Conclusion: The combination of protein sources and the GI of the carbohydrates may influence subjective appetite sensations, but the results are inconclusive. It seems that salmon potentially can suppress appetite to a greater extent than veal, as ghrelin levels were lower after consumption of the meals with salmon.

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PO2.007

The relationship between ghrelin forms and malnutrition in hemodialysis patients

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Loss of appetite in patients is a frequent result of hemodialysis (HD) treatment. Loss of appetite in such patients causes malnutrition (PEM) by decreasing energy and especially protein intake (1). PEM is a frequently occurring factor, which increases morbidity and mortality in hemodialysis patients. It also diminishes the life span of dialysis patients. Malnutrition occurs in 23–76% of hemodialysis patients (1). Ghrelin, produced by X/A like cells in the gastric fundus mucosa oxyntic glands, is a 28-amino acid hormone, which releases growth hormone and has a role in regulation of energy balance and food intake (2). Besides, ghrelin is also released by some tissues like kidney, brain, liver, pancreas, pituitary gland and ad-

ipose tissue. Ghrelin exists in two forms as ghrelin and desacyl-ghrelin (80–90%) in the human body (3). Studies indicate that although plasma ghrelin levels are found to be higher in HD patients than healthy individuals, HD patients suffer from poor appetite (4). This situation results from that desacylated ghrelin level, which is one of the basic forms of ghrelin, is found to be approximately four times higher in HD patients than in healthy individuals (5). Studies indicate that that the rats are given desacylated ghrelin leads to decrease in food intake and increase in weight loss (6,7). While acylated ghrelin increases appetite, and thus weight gain and adiposity, desacyl-ghrelin, on the other hand, is known to cause loss of appetite by taking place in adipogenesis, cell renewal and some endocrine events (8). In conclusion, desacylated ghrelin level increases in HD patients; thus, it may have an effect on loss of appetite related malnutrition development.

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PO2.008

Adipokines in Breast Milk and Growth

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Breast milk can meet infants' need of macro and micro nutritional elements. Also, it includes bioactive factors such as enzymes, immune factors and cytokines. Epidemiologic studies indicate that breast milk contributes significantly to infant growth and development, it also protects against obesity and metabolic diseases in later periods. It is considered that nutritive and protective role of the breast milk is due to not only its nutritional element composition, but also protein-structured hormone called "adipokine", which has recently been detected in breast milk. The aim of this paper was assessment of the relationship between adipokines in breast-milk and infant growth. Adipokines are stated to serve many physiologic functions such as nutrition, appetite, energy balance, insulin and glucose metabolism, lipid metabolism, regulation of blood pressure, coagulation. It has been stated that adipokines in breast milk, as their possible effects, regulate growth during neonatal period, growth and appetite during later periods in life, programme energy intake and affect body composition; thus, adipokines protect against metabolic diseases such as obesity, type 2 diabetes. The relationship between adipokines such as leptin, adiponectin, ghrelin, resistin, which have been recently detected in breast milk, and infant growth has become more of an issue. Further studies also indicate that when infants are grouped according to their gestational age (preterm, term), there is difference in the levels of these hormones in breast milk; and accordingly, there may be differences also in the growth rate of infants. Adipokines especially leptin, adiponectin, ghrelin are important in affecting energy balance. Consequently, the 0–6 months of infants is a sensitive period and so breastmilk is unique for infant feeding.

Weight loss and associated improvements in cardiometabolic risk factors with liraglutide 3.0 mg in the SCALE Obesity and Prediabetes randomised, double-blind, placebo-controlled 3-year trial

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Background & Aims: Obesity and prediabetes are risk factors for developing type 2 diabetes mellitus (T2D). A 5–10% weight loss can reduce risk of developing T2D by more than 50%.

Objectives: This phase 3 trial investigated the effects of liraglutide 3.0 mg, as adjunct to diet and exercise, on delaying the onset of T2D over 3 years (primary endpoint), body weight and cardiometabolic risk factors. **Methods:** Individuals (BMI ≥ 30 kg/m², or ≥ 27 kg/m² with ≥ 1 comorbidity) advised on a 500 kcal/day deficit diet and 150 minutes/week exercise programme were randomised 2:1 to once-daily subcutaneous liraglutide 3.0 mg (n = 1505) or placebo (n = 749). Efficacy data are observed means, with last-observation-carried-forward (LOCF) imputation. Clinicaltrials.gov ID: NCT01272219.

Results: Baseline characteristics were (mean \pm SD): age 47.5 \pm 11.7 years, 76.0% female, weight 107.6 \pm 21.6 kg, BMI 38.8 \pm 6.4 kg/m². Time to onset of T2D over 160 weeks was 2.7 times longer with liraglutide 3.0 mg than placebo [95%CI 1.9; 3.9] and the risk of developing T2D (3% vs 11% cumulative incidence) was reduced by 79.3% (p < 0.0001). More individuals on liraglutide (66%) than on placebo (36%) had regressed from prediabetes (ADA 2010 criteria) to normoglycaemia by week 160 (odds ratio 3.6 [3.0; 4.4], p < 0.0001). Individuals on liraglutide 3.0 mg lost more body weight than those on placebo (6.1% vs 1.9%; estimated treatment difference [ETD] -4.3% [95%CI 4.9; -3.7]), accompanied by greater mean reductions in waist circumference (ETD 3.5 [4.2; 2.8] cm), systolic BP (ETD 2.8 [-3.8; -1.8] mmHg), triglycerides (ETD -6% [9; -3]) and high-sensitivity C-reactive protein (ETD 29% [-34; -23]) (all p < 0.001). Mean pulse increased with liraglutide 3.0 mg vs placebo (ETD 2.0 [1.2; 2.7] beats/min, p < 0.0001). Adverse event incidence was 94.7% with liraglutide 3.0 mg vs 89.4% with placebo, serious events 15.1% vs 12.9%. Adjudicated major adverse cardiovascular events (non-fatal myocardial infarction or stroke, cardiovascular death) were low overall (0.19 vs 0.20 events/100 patient-years-of-observation for liraglutide 3.0 mg vs placebo). **Conclusion:** Liraglutide 3.0 mg, as adjunct to diet and exercise, delayed the onset and reduced the risk of T2D over 3 years in adults with prediabetes, reduced body weight and improved cardiometabolic risk factors. **Funding:** Novo Nordisk.

Liraglutide 3.0 mg reduced the risk of developing type 2 diabetes and decreased body weight in the SCALE Obesity and Prediabetes randomised, double-blind, placebo-controlled trial

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Background & Aims: This 3-year trial investigated the effect of liraglutide 3.0 mg, as an adjunct to diet and exercise, in delaying the onset of type 2 diabetes (T2D; primary endpoint) in adults with prediabetes and obesity (BMI ≥ 30 kg/m²), or in those with prediabetes and overweight (≥ 27 kg/m²) with comorbidities.

Methods: Participants were randomised 2:1 to once-daily subcutaneous liraglutide 3.0 mg or placebo; all were advised on lifestyle intervention with a 500 kcal/day deficit diet and 150 min/week exercise. Efficacy data are observed means, with the last observation carried forward for missing values. Clinicaltrials.gov ID: NCT01272219.

Results: Of 2254 randomised individuals with prediabetes (age 47.5 \pm 11.7 years, 76.0% female, weight 107.6 \pm 21.6 kg, BMI 38.8 \pm 6.4 kg/m², mean \pm SD), 1128 completed 160 weeks of treatment (52.6% on liraglutide 3.0 mg, 45.0% on placebo). At week 160, mean weight loss was 6.1% with liraglutide 3.0 mg vs 1.9% with placebo (estimated treatment difference 4.3% [95%CI -4.9; -3.7], p < 0.0001). Comparing liraglutide 3.0 mg and placebo, 49.6% vs 23.7% of individuals achieved at least 5% weight loss (estimated odds ratio [OR] 3.2 [2.6; 3.9]) and 24.8% vs 9.9% achieved more than 10% weight loss (OR 3.1 [2.3; 4.1]), both p < 0.0001. The time to onset of T2D over 160 weeks was 2.7 times longer with liraglutide 3.0 mg vs placebo (95%CI 1.9; 3.9) and the risk of developing T2D (3% vs 11% estimated cumulative incidence for liraglutide 3.0 mg vs placebo) was reduced by 79.3% with liraglutide 3.0 mg (p < 0.0001). Liraglutide 3.0 mg was generally well tolerated. Withdrawal rates due to adverse events were 13.3% with liraglutide 3.0 mg vs 6.2% with placebo; serious events were 15.1% vs 12.9%. Gallbladder-related events (2.9 vs 1.2/100 patient years of observation [PYO]) and confirmed pancreatitis (0.29 vs 0.13 events/100 PYO) were low, but more frequent with liraglutide 3.0 mg than with placebo. **Conclusion:** Liraglutide 3.0 mg, as an adjunct to diet and exercise, delayed the onset and reduced the risk of developing T2D over 3 years compared to placebo, provided greater sustained weight loss, and was generally well tolerated.

Funding: Novo Nordisk.

Multi-level and multi-scale drug simulations for weight regulation and obesity

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Background & Aims: Obesity and the metabolic syndrome is both a multi-level (intra-cellular to whole-body) and multi-scale (seconds to years) phenomenon, and to properly understand the action of a drug, these aspects need to be understood in combination. Such an understanding can only be obtained using systems pharmacology approaches, combining large amounts of data with mathematical modelling. We have previously developed multi-level models [1–2], explaining the intracellular origin of insulin resistance in adipocytes, and its translation to the whole-body. Others have previously developed multi-scale models, describing long-term weight changes. However, such models have never before been combined into a joint understanding.

Objectives: Here I will present a first model that can describe both multi-level and multi-scale data for obesity and the metabolic syndrome. I will also demonstrate the usefulness of this model for drug simulations. **Material & Methods:** The model is based on ordinary differential equations and has been implemented in matlab. The experimental data include e.g. measurements of proteins inside cells (by immunoblotting), Oral Glucose Tolerance Tests measuring glucose and insulin, and long-term weight and drug concentration changes.

Results: The combined model (Fig 1C-E) can simultaneously describe data on both long-term weight-loss induced by the drug topiramate and diet (Fig 1B), the plasma glucose responses within a day (Fig 1A), and intracellular protein changes (Fig 1F, 2A-D, [1–2]). The model can also describe independent validation data to which it has not previously been fitted (Fig 2E, [1–2]). Finally, the model can be used to simulate the effect of novel drug targets, in so-called *in silico* experiments [1].

Conclusion: We can now for the first time simultaneously describe large sets of data that are both multi-level and multi-scale. This allows us to do virtual screenings of potential drugs in computer models, in a way that is much faster and cheaper than experimental screenings in cells or animals. This also means that we now have a framework into which an ever-growing body of knowledge and data can be integrated.

References:

1 Brännmark et al.: *J Biol Chem*, 288(14):9867–80, 2013.

2 Nyman et al.: *J Biol Chem*, 289(48):33215–30, 2014.

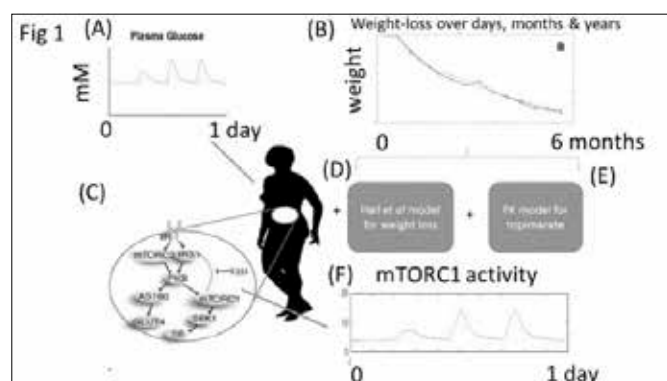


Fig. 1. Outline of the model (C-E), and its long-term (B), medium-term (A), and short-term (F) responses.

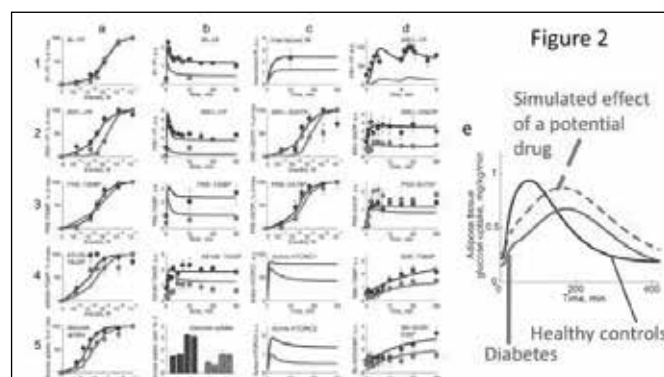


Fig. 2. Comparison between model (lines) and data (dots) for dose-responses (a1–5, c2–3) and time-responses (all others). (e) simulated effect of a meal in diabetes and healthy control (both for which we know the response from experiments) with that of a potential drug (dashed, new prediction)

PO2.012

Neuropsychiatric safety profile with liraglutide 3.0 mg for weight management across randomised, placebo-controlled, double-blind phase 2 and 3 trials

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Background & Aims: Liraglutide, a GLP-1 analogue, regulates appetite centrally via receptors in the brain. Here we present pooled neuropsychiatric safety data from one phase 2 and four phase 3 trials with liraglutide 3.0 mg.

Methods: Individuals were randomised to once-daily subcutaneous liraglutide 3.0 mg (n = 3395) or placebo (n = 1943), as adjunct to a 500 kcal/day deficit diet plus exercise. Two mental health questionnaires (MHQs), the Patient Health Questionnaire-9 (PHQ-9) and Columbia-Suicide Severity Rating Scale (C-SSRS), were used in the phase 3 trials. Individuals with a history or presence of suicidality in the month before randomisation, major depression in the last 2 years, or a PHQ-9 score ≥ 15 were excluded.

Results: Baseline characteristics (mean \pm SD) were: age 46.9 ± 12.0 years, 71.2% female, body weight 105.7 ± 21.4 kg, BMI 37.7 ± 6.3 kg/m². Across trials, weight loss was 5.7–9.2% with liraglutide 3.0 mg and 0.2–3.1% with placebo. At baseline, 9.7% of individuals reported history of depression, 7.4% of anxiety; 3.4% reported suicidality (>1 month before randomisation), 0.16% with suicidal behaviour, on the C-SSRS. Mean baseline PHQ-9 scores of 2.8 vs 2.9 (indicating no depression) for liraglutide 3.0 mg vs placebo improved by $\sim 35\%$ in each group at end-of-treatment (last-observation-carried-forward [LOCF]); 6.1% vs 6.8% scored ≥ 10 (moderate depression or worse) at any time of treatment, 1.1% vs 1.5% scored ≥ 15 (moderately severe or worse). 21 individuals (0.64%) on liraglutide 3.0 mg vs 14 (0.76%) on placebo reported suicidal ideation on the C-SSRS during treatment. Across trials, anxiety (2.0% vs 1.6%) or depression (1.8% vs 1.6%) adverse events (AEs) were similar for liraglutide 3.0 mg vs placebo; they were mostly mild and did not lead to withdrawal. Six individuals

(0.2%) on liraglutide reported suicidal ideation AEs (1 suicide attempt) vs none on placebo; one withdrew.

Conclusion: No signal for anxiety or depression was noted with liraglutide 3.0 mg based on AE reporting or MHQs, though an imbalance in suicidal ideation AEs was seen. Similar to other centrally-acting anti-obesity medications, patients on liraglutide 3.0 mg should be monitored for depression or suicidal thoughts, and treatment discontinued if symptoms develop, as per the US label.

Funding: Novo Nordisk.

PO2.013

Effects of L-Carnitine Supplementation on Inflammatory Factors and Malondialdehyde in Patients with Nonalcoholic Steatohepatitis (NASH)

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Non-alcoholic fatty liver, a chronic inflammatory disease, is accompanied by accommodation of extra fat and occurrence of oxidative stress in liver. L-carnitine with anti-inflammatory and anti-oxidant properties may have beneficial effects on NASH. This study was designed to assess the antioxidant and anti-inflammatory effects of L-carnitine on NASH patients' conditions. This randomized double-blind placebo-controlled clinical trial was performed in 68 patients suffering from NASH and 34 control subjects. NASH patients were randomly divided into groups of L-carnitine (receiving 2000 mg L-carnitine supplements) ($n = 36$), placebo ($n = 32$). Fasting blood samples were taken at study baseline and after 12 weeks of intervention to quantify inflammatory factors and malondialdehyde. L-carnitine supplementation resulted in a significant reduction in serum malondialdehyde (MDA) (-9.93 ± 3.79 vs. $+1.76 \pm 2.93$ and $+0.16 \pm 2.44$ $\mu\text{mol/L}$, $P = 0.01$) compared with placebo and control groups. Within-group comparisons revealed a significant reduction in serum high sensitivity C-Reactive Protein (hs-CRP) ($P = 0.02$), Transforming Growth Factor- $\beta 1$ (TGF- $\beta 1$) ($P = 0.02$), Tumor Necrosis Factor- α (TNF- α) ($P = 0.004$) and Malondialdehyde (MDA) ($P = 0.01$) levels in the L-carnitine group. After adjusting for covariates, significant decrease of hs-CRP, TNF- α and MDA were found in the L-carnitine group compared to placebo and control groups. In conclusion, L-carnitine supplementation for 12 weeks among patients suffering from NASH had beneficial effects on MDA, TNF- α and hs-CRP levels; however, it did not affect TGF- $\beta 1$.

PO2.014

Nicotinic anti-inflammatory pathway: A new target to control low-grade inflammation and glucose homeostasis in obesity

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Obesity is a chronic inflammatory state linked to insulin resistance, impaired glucose tolerance and Type 2 diabetes. The cholinergic anti-inflammatory pathway, mediated by nicotinic acetylcholine receptors (nAChRs), represents a novel target in the treatment of obesity and associated complications. We tested the efficacy of a novel spirocyclic $\Delta 2$ -isoxazoline (R)-(-)-ICH-3 (ICH3), a selective agonist of $\alpha 7$ nAChRs, with a five-fold higher binding affinity than PNU-282987, in vitro, on primary human adipose cells from subcutaneous (SAT) and visceral adipose tissue (VAT) and in vivo on mice under LPS-induced inflammation (acute stimulation, 30 mg/Kg) as well as in mice under Diet induced obesity (DIO) (ICH3 chronic stimulation, 20 mg/Kg/day for 4 weeks). In vitro, ICH3 stimulation of SAT and VAT adipocytes resulted in a significant positive modulation of adiponectin gene and down-regulation of interleukin-6 and Tumor Necrosis factor alpha genes (assessed by RTqPCR). In vivo, the acute ICH3 administration resulted in a significant antipyretic effect, while ICH3 chronic administration in DIO mice diminished fasting glucose and affected the leucocytes population infiltrating the epididymal adipose tissue. These results suggest ICH3 as a safe drug candidate to modulate inflammation and glucose homeostasis in obesity.

PO2.015

Exendin-4, a GLP-1 analogue, decreases the extracellular matrix protein elastin in human omental adipose tissue

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Background and Aims: Adipose tissue's (AT) cells are embedded in a dense extracellular matrix (ECM) composed of adhesion proteins (e.g., fibronectin, proteoglycans) and structural proteins (collagens, elastin) whose respective accumulation defines AT's mechanical properties. AT enlargement characterising obesity is associated with ECM remodelling that can lead to fibrosis, one of the main features of AT dysfunction. GLP-1 (glucagon-like peptide-1) analogues are commonly used for type-2 diabetes treatments and have recently been approved for obesity due to their effect on satiety which aids weight loss. In this study, we assessed if, when excluding the bias of weight loss, GLP-1 analogues can improve accumulation of AT's ECM components in both omental (OMAT) and subcutaneous AT (SCAT).

Objectives: To explore the effects of the GLP-1 analogue Exendin-4 on the expression of AT's ECM components and their regulators ex vivo.

Materials/Methods: Human OMAT and abdominal SCAT obtained from women undergoing elective surgery were used for culture with increasing doses of Exendin-4 for 45 hours. Expression of ECM components and their regulators were analysed by RT-qPCR and ELISA. GLP-1R expression was analysed on paired samples from both fat pads by Western blot.

Results: Elastin was expressed at similar levels in both OMAT and SCAT. Exendin-4 reduced, in OMAT, both elastin expression and secretion with no modification in SCAT. We did not observe any alteration in other ECM components (collagens and fibronectin) and their regulators (CTGF, TGF- $\beta 1$, LOX) expression. GLP-1R protein was higher expressed in SCAT.

Conclusion: This study showed that, without the bias of weight loss which characterises in vivo studies, GLP-1 analogues can selectively alter human elastin expression and secretion in OMAT. This decrease in elastin accumulation without any alteration of collagens expression may decrease elastin/collagens ratio leading to an increase in AT's rigidity. GLP-1 analogues may thus not have a beneficial effect on AT remodelling. Changes with concomitant weight loss need to be further explored.

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Sleeve gastrectomy improves non-alcoholic fatty liver by reducing the expression of lipogenic transcription factors in diet-induced obese rats

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Introduction: Non-alcoholic fatty liver disease (NAFLD) is a pathology characterized by a significant triacylglycerol accumulation in the hepatocytes of the liver parenchyma.

Objective: Our aim was to analyze the potential participation of lipogenic transcription factors in the improvement of hepatic steatosis after sleeve gastrectomy, a stomach-reducing bariatric surgery procedure, in an experimental model of diet-induced obesity (DIO).

Methods: DIO male Wistar rats (n = 161) were subjected to surgical (sham operation and sleeve gastrectomy) or dietary interventions [fed ad libitum a normal diet (ND) or a high-fat diet (HFD) or pair-fed to the amount of food eaten by sleeve-gastrectomized animals]. The expression of factors involved in lipogenesis was analyzed in liver biopsies by real-time PCR.

Results: Four weeks after surgery, DIO rats subjected to sleeve gastrectomy showed a significant (P < 0.05) decrease in body weight, whole-body adiposity and hepatic steatosis. DIO was associated with an upregulation (P < 0.05) in Ppara, Pparg and Srebf1. Rats undergoing sleeve gastrectomy exhibited a tendency towards a reduction in hepatic lipogenic transcription factors Ppara, Pparg and Srebf1 compared to sham-operated animals. Caloric restriction by pair-feeding was also related to lower gene expression of lipogenic factors, but to a lesser extent than that observed after sleeve gastrectomy, suggesting that changes in lipogenic transcription factors after bariatric surgery are beyond food intake reduction.

Conclusions: Our findings show, for the first time, that sleeve gastrectomy, a widely applied bariatric surgery procedure, reduces lipogenic transcription factors, thereby improving the lipid deposition in liver parenchyma. 1. Conflict of Interest: The authors declare that they have no conflict of interest. 2. Funding: This work was supported by Fondo de Investigación Sanitaria-FEDER (FIS PI12/00515 and PI13/01430) from the Instituto de Salud Carlos III, the Department of Health of the Gobierno de Navarra (61/2014) as well as by the Plan de Investigación de la Universidad de Navarra (project PIUNA 2011–14). CIBEROBN is an initiative of the Instituto de Salud Carlos III, Spain.

The role of {VEGFA} in regulation of fat distribution

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Background: Body fat distribution as one of the main predictors of obesity associated complication is controlled by genetic factors. Polymorphisms in the vascular endothelial growth factor A (VEGFA) have been shown to be associated with waist to hip ratio (WHR) in recent genome-wide association studies. We tested the hypothesis that VEGFA is involved in the control of fat distribution and its expression correlates with obesity related traits.

Material and Methods: We measured the mRNA levels of VEGFA in paired human samples of visceral and subcutaneous adipose tissue from 570 individuals with detailed metabolic testing. VEGFA mRNA levels in PBMC and VEGFA serum levels were measured in a second independent cohort (Sorbs from Germany; N = 1000). Previously reported single nucleotide polymorphisms (SNPs) rs1358980 and rs6905288 associated with WHR were genotyped in all subjects. We conducted correlation analyses as well as eQTL and genetic association studies to test the relationship between VEGFA mRNA, serum concentrations, metabolic traits and the SNPs.

Results: The mRNA expression of VEGFA was significantly higher in visceral adipose tissue vs. subcutaneous adipose tissue (p < 0.001). In addition the mRNA levels correlated with % body fat (p < 0.05, adjusted for sex and age) and waist (adj. p < 0.001). Also the mRNA expression in PBMC showed a significant correlation with % body fat and BMI (p < 0.05, adjusted for sex and age). Rs1358980 was associated with waist and hip and both SNPs exhibited association with traits of the lipid metabolism (total and LDL cholesterol; adj. p < 0.05). Finally, eQTLs were found for rs1358980 (adj. p < 0.01) and rs6905288 (adj. p < 0.05) in visceral adipose tissue.

Conclusion: Our data support the involvement of VEGFA in regulation of fat distribution. The observed eQTLs suggest that SNP associations with WHR might be mediated by their effects on mRNA expression.

Very-high-fat and low-fat isocaloric diets exert similar metabolic benefits but different temporal effects on cardiometabolic risk markers

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Objectives: Low-carbohydrate diets very high in total and saturated fat may, despite possible weight-loss advantages, increase cardiometabolic risk. In this randomized controlled trial (FATFUNC) we sought to determine macronutrient-specific effects on ectopic fat deposition and circulating risk markers. DESIGN: 46 abdominally obese men were randomized to either a very-high-fat low-carbohydrate (VHFLC) or low-fat high-carbohydrate (LFHC) diet for 12 weeks. The diets were isocaloric, provided equal protein and polyunsaturated fatty acids (PUFA), and emphasized low-processed foods. Dietary intake based on food weighing was recorded monthly for 5 consecutive days. Blood samples were collected at baseline and after 4, 8 and 12 weeks. Changes in body composition were quantified by bioelectrical impedance (InBody 720) and computed tomography (CT) imaging.

Results: Recorded intakes of carbohydrate, total and saturated fat in the VHFLC/LFHC groups were 11/51, 71/29 and 34/12 energy percent, respectively. Both diets similarly reduced body weight, percent body fat, visceral fat mass, hepatic lipid content and circulating levels of triacylglycerols (TAG), insulin and HbA1c, and HOMA1-IR (all p < 0.01). Diet-dependent responses were observed for total and LDL cholesterol (decreased only on LFHC) and HDL cholesterol (increased only on VHFLC). Non-esterified fatty acids (NEFA) increased on both diets from baseline to 4 and 8 weeks, and returned to baseline levels after 12 weeks. On the VHFLC diet, all biochemical variables improved significantly from 8 to 12 weeks only, indicating that it may take at least 2–3 months to fully adapt to this type of diet (ketoadaptation). A more gradual response from baseline to 12 weeks was seen in the LFHC group, except for NEFA.

Conclusions: Both diets led to significant improvements in body composition and circulating risk factors, but with different temporal changes.

Our data do not support that dietary fat per se promotes ectopic adiposity and cardiometabolic syndrome in humans.

PO2.019

Obesity and hepatic fibrosis in diabetic patients

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Background and Aims: Diabetes is now the most common cause of liver disease in the U.S. Liver dysfunction in people with type 2 diabetes mellitus is thought to be mainly caused by non-alcoholic fatty liver disease (NAFLD). Objective The objective of this study was to investigate the relationship between obesity and hepatic fibrosis (HF) in diabetic patients.

Material and Methods: We conducted a cross-sectional multicenter study which included a total of 144 patients with type 2 diabetes, 74 women (51.4%). There were followed the anthropometric indicators (weight, height, waist circumference, body mass index (BMI)). The biochemical parameters followed were fasting plasma glucose (FPG), lipid profile, liver function tests, blood count. Serum concentrations of adiponectin, leptin, resistin, insulin, TNF-alpha, IL-6 were measured with ELISA method. Insulin resistance (IR) was estimated by the homeostasis model assessment (HOMA). Liver fibrosis was non-invasively assessed using the Forns index; a value >6.9 was a predictor for significant fibrosis. Multivariate analysis based on backward logistic regression was used to evaluate the association between hepatic fibrosis and metabolic factors.

Results: Median age was 53.2 years. The prevalence of obesity was 44.4% (n = 64). The prevalence of fibrosis evaluated by Forns Index was 24.35% (n = 35). Forns index was higher in patients with obesity (p = 0.023), and with HbA1c >8% (p = 0.041). Leptin, TNF-alpha, IL-6, and resistin were significantly higher in patients with diabetes and hepatic fibrosis (all p < 0.05). In multivariate analysis, independent predictors of fibrosis were age (OR: 1.13, 95% CI: 1.02–1.34), BMI (OR: 2.11, 95% CI: 1.01–3.46), insulin resistance (OR: 2.32, 95% CI: 1.48–3.66), and TNF-alpha (OR: 1.2, 95% CI: 1.1–1.74).

Conclusion: In the present study, the predictive factors for hepatic fibrosis in diabetic patients were: age, body mass index, HOMA-IR over 4, and TNF- alpha.

PO2.020

The influence of glucose homeostasis on abdominal fat

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Introduction: The primary objective of the present study was to evaluate the influence of glucose homeostasis, evaluated by HOMA, on waist circumference (WC) and abdominal circumference (AC) promoted by a 6-month weight loss program, based on a multidisciplinary approach, with personalized interventions and lifestyle group sessions.

Methods: The sample comprised 94 adults (40.8 ± 10.1yr; 30.7 ± 5.5kg/m²). Body weight, WC and AC were assessed at baseline and at the end of the 6-months loss program with an electronic scale (SECA, Hamburg, Germany) and with a tape measure. The 6-month weight loss program was composed by lifestyle weight loss group sessions and all the participants were follow by a multidisciplinary team comprised a physician, a nutritionist, a psychologist and an exercise physiologist. Glucose homeostasis was evaluated by HOMA Test (baseline insulin (μU/ml) x baseline glucose (mg/dl) / 405) at baseline. Multiple regression analysis was per-

formed to assess the multivariate relationships between glucose homeostasis and WC and AW alterations.

Results: At 6-month, participants lost, on average, 6.4kg±6.2kg (p < .001) of initial body weight (range:-6.7Kg-26.4Kg loss), with no differences between genders (p > .05). Glucose homeostasis was not associated with waist circumference alterations neither with abdominal circumference alterations (p > 0.05). No correlation was found between baseline glucose homeostasis and abdominal variables alterations at 6-month (p > .05).

Conclusions: According to the literature, the relation between IR and abdominal fat mass is not yet fully elucidated. However, this analysis suggested that glucose homeostasis does not influence abdominal fat loss in adults that follow a 6-month weight loss commercial program.

PO2.021

DPP-4 deletion in adipose tissue leads to protective remodeling under high fat diet

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We have previously characterized dipeptidyl peptidase 4 (DPP4) as a novel adipokine linking obesity to the metabolic syndrome in humans. DPP4 is a current therapeutic target in type 2 diabetes. To elucidate the role of adipose DPP4 in high fat diet-induced obesity, an adipose-tissue (AT) specific DPP4 KO mouse was generated with a Cre-lox strategy under control of the ap2 promoter. DPP4 expression in mature adipocytes from KO mice was reduced up to 65% with unchanged expression in the SVF. Under HFD, KO animals displayed lower serum DPP4 and gained significantly more weight. However, oral glucose tolerance and suppression of endogenous glucose production was improved. In line, HOMA-IR was significantly lower in KO mice on HFD, although no differences were observed in intraperitoneal ITT and GTT. Adipocyte size was reduced in KO mice under HFD mice in both inguinal and epididymal WAT. Markers of adipogenesis remained similar whereas the M2 macrophage markers macrophage mannose receptor 1 and interleukin (IL)-10 were significantly upregulated in KO animals compared to WT under HFD in both depots. In eWAT, IL-6 and monocyte chemotactic protein 1 were significantly increased in KO mice. KO animals on HFD displayed an increased number of crown-like structures in eWAT. This effect was paralleled with a decrease in the markers of fibrosis (Col1A1, Col3A1 and Col6A6). Both resistin and IGFBP3 levels were significantly reduced in the conditioned media obtained from explants of eWAT from KO animals under HFD. Serum DPP4 correlated significantly with adipocyte size in both iWAT and eWAT while negatively with serum adiponectin. Our model proves that AT is an important source of DPP4 in mice. Under HFD, the KO animals exhibited improved glucose tolerance and hepatic insulin resistance despite more weight gain. Since these animals displayed smaller adipocytes, increased clearance of apoptotic adipocytes and reduced fibrosis in the eWAT, we propose that DPP4 deletion triggers a beneficial remodeling more specifically in eWAT during HFD, potentially through a reduced production of resistin and IGFBP3 in this depot.

PO2.022

Interleukin-6 induces impairment in human sub-cutaneous adipogenesis in obesity associated insulin resistance

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Aims and Hypothesis: Some obese subjects remain insulin sensitive by mechanisms, as yet, poorly understood. This study investigated, in tissue from insulin sensitive (IS) and insulin resistant (IR) obese subjects, the hypotheses that: 1) maintenance of normal sub-cutaneous (SC) adipogenesis accounts at least partially for this protective phenotype, and 2) this protection is abrogated by chronic exposure to the inflammatory cytokine interleukin-6 (IL-6).

Methods: Adipose-tissue biopsies were collected from clinically well characterized patients (n = 57) undergoing weight reduction surgery. The adipogenic capacity and gene expression profiles of isolated preadipocytes was quantified, along with local IL-6 secretion.

Results: Despite being equally obese, IR subjects had significantly lower plasma leptin and adiponectin, compared to their age-matched IS counterparts. Higher systemic IL-6 was associated with hyperplasia of the stromal vascular cells in the IR group. SC preadipocytes from these tissues exhibited lower adipogenic capacity (27% less) accompanied by down-regulation of PPAR γ and CEBP α and up-regulation of GATA3 mRNA expression. Impaired SC adipogenesis in IR was further associated with increased local secretion of IL-6 (33% greater in IR compared to IS). Treatment of IS-derived SC-preadipocytes with IL-6 (20 ng/ml) reduced their adipogenic capacity (46%) to levels of the IR group.

Conclusion: This study shows for the first time that obesity-associated insulin resistance is marked by impaired SC adipogenesis leading to reduced adipose storage capacity for triacylglycerol that is mediated, at least in a subset of patients, by elevated local IL-6. Understanding the molecular mechanisms of the dysregulated preadipocyte adipogenic capacity in IR subjects could help target appropriate therapeutic strategies to patients with the greatest obesity-associated risk of insulin resistance and type 2 diabetes mellitus.

PO2.023

Paired related homeobox 1 (PRRX1) regulates (HIF1 α and) glycolysis in human adipocytes

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Objective: Paired related homeobox 1 (PRRX1) is a homeobox transcription factor found to repress PPARG2 expression in adipose cells, thereby increasing the risk of type 2 diabetes through adverse effect on insulin sensitivity and lipid metabolism. Here we investigated possible additional roles of PRRX1 in regulating adipocyte function. **Methods/**

Results: In order to gain further insight into genes regulated by PRRX1 in human adipose cells, we analyzed global gene expression changes after PRRX1 knock-down in differentiating primary human adipose cells. 1,042 genes showed reduced expression after PRRX1-knock down, where genes involved in glycolysis showed the strongest enrichment in gene ontology (GO) analysis. The PRRX1-dependent expression of glycolytic genes was validated by qPCR. Since hypoxia-inducible factor 1 α (HIF1 α) is known to regulate glycolysis, and because HIF1 α was strongly

downregulated after PRRX1-silencing, we examined if PRRX1 might regulate hypoxia-responsive genes. Performing Gene Set Enrichment Analysis (GSEA) based on 150 hypoxia-induced and HIF1 α -associated genes in SGSB adipocytes, we found that as many as 48 of these hypoxia-stimulated genes also responded to PRRX1 knock-down in primary human adipose cells. This response seemed to be independent of PPARG2. Finally, we measured glycolytic gene expression after PRRX1-knock down concomitant with hypoxia stimulation, and found a reduced expression of HIF1 α and glycolytic genes in PRRX1-silenced cells.

Conclusion: Our results suggest that PRRX1 may be a novel modulator of genes responsive to hypoxia, at least in part via down-regulation of HIF1 α and independently of PPARG2. 1. Conflict of interest: None disclosed 2. Funding: Funding for this project was provided by Samarbeidsorganet Helse Vest RHF and Meltzerfondet.

PO2.024

Effects of CXCR2 signaling axis on BMSCs adipogenesis

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Background & Aims: Chronic low-grade inflammation plays a key role in the development of obesity. Several reports have shown that chemokines and its receptors participated in the development of obesity-induced insulin resistance. The present study assessed the effect of CXCL1 and its receptor CXCR2 on adipogenesis.

Objectives: To investigate CXCL1 and its receptor CXCR2 expression and function in adipogenesis. **Material & Methods:** We measured the expression of CXCL1 and CXCR2 during adipogenic differentiation of mouse bone marrow stromal cells (BMSCs). BMSCs were treated with the absence or presence of recombinant proteins CXCL1, neutralizing CXCL1 antibodies or CXCR2 antagonist SB225002 daily during adipogenesis.

Results: We found that CXCL1 is highly expressed during adipogenesis. Increased or neutralised CXCL1 levels has no effects on adipogenesis. However, when BMSCs were treated with CXCR2 antagonist SB225002, the adipogenesis increased during the early stage of differentiation but is significantly inhibited in the mid and terminal stage of differentiation. **Conclusion:** CXCR2 signaling axis participate the adipogenic differentiation of BMSCs and may exert different functions during adipogenesis.

Effects of CXCR2 antagonist SB225002 on adipogenesis of BMSCs.

Genes expressed in BMSCs(black bar) and SB225002 treated (grey bar) in adipogenesis.

PO2.025

Insulin Resistance And Subclinical Inflammation Seem To Be Major Factors In The Regulation Of Klotho

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Background and Aims: Deletion of Klotho results in a phenotype mimicking premature aging (atherosclerosis, shortened lifespan). In vitro studies imply a role in adipocyte turnover and glucose metabolism. Klotho knockout mice are resistant to obesity and insulin sensitive. We investigated Klotho in patients before and 2 years after weight loss induced by bariatric surgery (BS).

Objectives: We investigated Klotho in patients before and 2 years after weight loss induced by bariatric surgery (BS).

Material/Methods: We investigated 60 patients (mean age: 41 \pm 10 years; mean BMI: 45.8 \pm 5.5 kg/m²) with morbid obesity (MO) and 20 controls (CO; 30 \pm 8 years; 23.4 \pm 4.2 kg/m). Weight, cardiovascular risk factors,

glucose tolerance tests, renal and inflammatory parameters, as well as Klotho levels were obtained

Results: Patients with MO have lower Klotho than CO (563[IQR:454–683] vs. 817[IQR: 669–1228]pg/ml;p < 0.001.) In the whole group, Klotho increased after BS to 610(IQR:502–730) pg/ml;(p = 0.022). In detail, Klotho increased only in patients with HOMA-IR<5 pre-operatively: 646 [502–890]pg/ml;p < 0.001), in patients with HOMA-IR>5 Klotho remained unchanged. A linear regression analysis in patients with HOMA-IR<5 revealed an association of delta (pre- minus post-surgery) Klotho with delta CRP (r=-0.483;p = 0.023) and delta Blood Glucose 2h post challenge (r=-0.452;p = 0.039). In patients with HOMA-IR>5 delta Klotho exhibited a trend to delta blood glucose 1h post challenge and delta HOMA-IR.

Conclusion: We hypothesize, that the increase in Klotho in patients with HOMA-IR<5 is related to the reduction of inflammation associated with weight loss. In contrast, in very insulin-resistant patients (HOMA-IR>5) the in comparison stronger reduction of Insulin resistance seems to outweigh the reduction of inflammation. Our data are first to confirm a hypothesized association between Klotho and Insulinresistance in humans.

PO2.026

MAP kinase phosphatase 3 inhibits brown adipocyte differentiation via regulation of Erk phosphorylation

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Brown fat has been highlight as a new therapeutic target for treatment of obesity and diabetes. However, molecular mechanism underlying brown adipogenesis are not fully understood. Here, we identified that MAP kinase phosphatase 3 (MKP3) has a novel role as regulator of brown adipocyte differentiation. The expression of MKP3 was significantly decreased during the early stage(s) of brown adipocyte differentiation in HIB-1B cells and primary cells. Ectopic expression of MKP3 led to reduced brown adipocyte differentiation, whereas depletion of MKP3 significantly enhanced the differentiation of primary brown preadipocytes. Consistently, we found an increased brown adipocyte differentiation in MKP3-null MEF cells. These inhibitory effects of MKP3 could be resulted via the temporal regulation of Erk activation. In recent, it was reported that MKP3 deficient mice are resistant to diet-induced obesity, and display enhanced energy expenditure. Taken together, we suggest that MKP3 could be an important factor in the regulation of brown adipocyte differentiation.

PO2.027

Identification of Mest gene expression as a predictive biomarker of adipose tissue expansion sensitive to dietary anti-obesity interventions

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Background/Aim: Early biomarkers predictive of white adipose tissue (WAT) accretion can serve to shorten animal trials assaying anti-obesity bioactives and, especially if derived from accessible samples such as blood, to monitor responsiveness to anti-obesity interventions (AOI) in humans. We sought to identify biomarkers of this type. We started from the previous identification, through global transcriptomics, of a set of genes in mouse WAT whose expression changes following short-term (5 days) high fat diet (HFD) are highly predictable for long-term HFD-induced changes [1]. We evaluated the sensitivity of these short-term gene expression changes in mouse WAT to dietary AOI, and the translatability of WAT results to whole blood cells (WBC) gene expression data.

Objective: To identify transcript-based biomarkers predictive of WAT expansion and sensitive to AOI.

Material/Methods: Experiment 1: C57BL/6J mice were challenged for 5 days with a HFD alone or incorporating established AOI: epigallocatechin gallate, replacing lipids by n-3 PUFA or increasing protein. Genes known to be similarly affected by short- and long-term HFD were analyzed in WAT. Experiment 2: C57BL/6J mice were challenged for 21 days with a HFD without or with hydroxytyrosol or resveratrol supplementation. Candidate genes derived from experiment 1 were analyzed in WBC at day 5.

Results: Experiment 1: Leptin and Mest (mesoderm-specific transcript) WAT mRNA levels were increased by HFD and normalized by all AOI. Experiment 2: Mest mRNA in WBC was induced by HFD and this induction was suppressed by hydroxytyrosol. Mest expression in WBC at day 5 positively correlated with adiposity and negatively with percent lean body mass and subcutaneous/visceral fat ratio at day 21.

Conclusion: Gene expression of Leptin and Mest in WAT and of Mest in WBC represent early markers of WAT expansion of potential usefulness in nutritional studies/trials [2].

References:

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PO2.028

Thylakoids shift adipocyte size distribution, PPAR-γ expression and lipid turnover in adipose tissue from high-fat fed mice

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Background & Aims: Dietary thylakoids have beneficial effects on obesity and hyperlipidaemia as demonstrated in humans and rodents (1). Established mechanisms include delayed fat digestion, a reduced rate of nutrient uptake and increased release of GLP-1 and CCK, affecting appetite. In the present study, we aimed to investigate the mechanism of action at adipocyte cell level.

Objectives: To examine effects of a thylakoid-enriched high-fat diet (thyl-HFD) for 14 days on adipocyte metabolism, cell size distribution and a possible role of PPAR gene regulatory elements mediating these effects as well as investigate the effects of thylakoids for three months on hepatic fat accumulation and the reversibility of body weight gain. Material&methods 10–12 week-old male C57B16 mice were fed either a high fat diet (HFD) or an isocaloric thylHFD, containing 33% w/w thylakoid extract (Appethyl®, Greenleaf Medical AB, Stockholm, Sweden).

Results: Thylakoid supplementation reduced fat mass and the size of white adipocytes from visceral adipose tissue. There was an upregulated protein expression of PPARγ as well as transcription factor coactivators PGC1-α and LPIN-1. Primary adipocytes displayed increased lipogenesis and decreased lipolysis independent of β-adrenergic stimulation. Moreover, thylakoids were found to protect against hepatosteatosis and HFD-induced body weight gain. The protective role of the thylakoid-enriched diet on body weight gain during long-term treatment was reversible.

Conclusion: These data suggest that thylakoid supplementation increases differentiation and lipid turnover in adipocytes through increased lipogenesis and fatty acid oxidation and protect against high-fat diet induced metabolic abnormalities via PPARγ-activation, a mechanism similar to the drugs of the thiazolidinedione family. The reversibility of body weight gain during long-term treatment with or without thylakoid-enriched diet suggests a set-point for regulation of body weight in rodents that could be changed by thylakoids.

Reference:

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Acknowledgements: Greenleaf Medical AB donated the thylakoid extract. Conflict of interest CEA is scientific advisor for Greenleaf Medical AB, part owner and board member of Thylabisco AB.

PO2.029

Human adipose tissue macrophages: Which types are we talking about?

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We investigated the inflammatory status of adipose tissue in a metabolically well-characterized group of patients: non-obese controls, non-obese type 2 diabetic patients and obese patients with and without insulin resistance. We used 13-colour flow cytometry to identify the constituent cell types in the stroma vascular fraction (SVF) of subcutaneous adipose tissue focusing on macrophage phenotypes. We have defined CD45+/CD14+/CD206+/CD11c+ cells as M1 and CD11c- as M2 macrophages. We found that, in the entire cohort of non-obese patients with and without diabetes M1/M2 macrophage ratio correlated positively with fat cell size, HbA1c, TNF- α secretion, and lipolysis. M1 macrophages correlated positively with HbA1c and TNF- α , while M2 macrophages negatively correlated with age. However, earlier studies report that adipose tissue resident macrophages show a mixed phenotype and a functional relevance of different macrophage populations to adipose tissue metabolism is still not fully elucidated. To more deeply characterize macrophages in the SVF of human adipose tissue in vivo we employed additional macrophage markers CD163 (for M2), CD197 (for M1), CD50 (for monocytes), ABCA1 and CD36 (for metabolically activated macrophages) and separated several different macrophage phenotypes using FACS. By combining cell sorting based on these different macrophage markers, mRNA expression and cytokine secretion profiling, single cell RNA sequencing data and metabolically characterized patient cohorts we aim to define a truly pro-inflammatory macrophage phenotype in human adipose tissue that would be a marker of WAT inflammatory environment and insulin resistance. The study is ongoing and preliminary data will be presented.

PO2.031

Relationship between obesity and cognitive function in young normal weight and obese women

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Background/Aims: Emerging evidence indicates that obesity may be detrimental to cognition. Few studies have examined the relationship between obesity and cognitive function in younger cohorts where obesity-related co-morbidities are not yet established.

Objectives: To investigate the relationship between obesity and cognitive function in healthy young women.

Material/Methods: A convenience sample of women (18–35 y) of normal (NW: BMI=18.5–25.0 kg/m²) or obese weight (OB: BMI \geq 30.0 kg/m²) was recruited. Participants completed a comprehensive, validated, computer-based cognition battery (IntegNeuro™) evaluating impulsivity,

attention, information processing, memory and executive function. Four potential confounding factors were also assessed, both individually and concurrently: depression (Depression, Anxiety and Stress Scale, DASS), physical activity (International Physical Activity Questionnaire, IPAQ) and inflammatory status (C-reactive Protein, CRP and Omega-3 Index, O3I). Data reported as z-scores (mean \pm SD), analysis via ANOVA and ANCOVA.

Results: 299 women (NW: n = 157, 24.9 \pm 4.6 y; OB: n = 142, 26.9 \pm 5.4 y) completed the study. OB women had higher levels of DASS (p < 0.001) and CRP (p < 0.001) but lower O3I (p < 0.001) and IPAQ (p < 0.001). Cognitive performance was within normal ranges but OB women had significantly lower performance on attention (NW: 0.31 \pm 1.38, OB: -0.25 \pm 1.38; p < 0.001) and had greater impulsivity (NW: 0.36 \pm 1.14, OB: -0.07 \pm 1.07; p = 0.033). After confounder adjustment, whether individually or concurrently, the results remained similar to the unadjusted model for attention and impulsivity, except that O3I attenuated the association for impulsivity (p = 0.12). On univariate analyses, however, significant differences remained after confounder adjustment for impulsivity (p = 0.007) and attention (p = 0.006), with a trend for memory (p = 0.061), again with the OB women scoring more poorly than the NW group.

Conclusion: There was a significantly lower (0.4–0.5 SD) cognitive performance in the attention and impulsivity domains in the OB group. The clinical importance of this is uncertain and longitudinal studies are needed to evaluate whether these differences persist or develop further over time.

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PO2.032

The relationship between overweight, obesity and cognitive function in adults: A systematic review and meta-analysis

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Background/Aims: Obesity may be detrimental to cognitive function and this may decrease work productivity and quality of life.^{1,2} Objective: To conduct a systematic review and meta-analysis to evaluate differences in cognitive performance between healthy weight (BMI 18.5–24.9 kg/m²) and overweight/obese (BMI \geq 25.0 kg/m²) adults.

Materials/Methods: A systematic review was conducted according to PRISMA guidelines across six databases. Studies were eligible if data was reported using a recognised and validated measure of cognitive function for both healthy and overweight/obese adults (\geq 18 y). Standardised mean differences (SMD) between the healthy weight versus overweight/obese groups were calculated for the psychometric test scores, and meta-analyses undertaken by generating a pooled estimate using a random-effects model.

Results: The search netted 39,335 potential manuscripts with 17 included for review. Total sample size was n = 2,027 (74% female), and mean age was 39.5 years (range 18–92). The array of psychometric tests administered (n = 30) represented three cognitive domains: executive function; memory; information processing speed. The most commonly administered tests were the Iowa Gambling Task and Trail Making Test. Meta-analyses revealed a small but significant pooled SMD for executive function (-0.345; p < 0.001), consistent with poorer performance in the obese. No differences in memory performance (SMD: -0.196; p = 0.069) and processing speed (SMD: -0.235; p = 0.106) were observed.

Conclusion: This study supports a negative association between obesity and executive function however the effect sizes identified from the meta-analysis were small and the clinical significance of the lower performance in the obese participants is uncertain.

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PO2.033

Relationship of omega-3 polyunsaturated fatty acid status with cognitive function in young normal weight and obese women

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Background/Aims: Obesity and systemic inflammation have been linked to decreased cognitive performance. The anti-inflammatory properties of omega-3 polyunsaturated fatty acids (n-3PUFA) have been identified as potentially benefiting cognitive function.

Objectives: Examine the association between obesity, n-3PUFA status and cognitive function in young Australian women.

Materials/Methods: A convenience sample of healthy women (18–35 y) of normal (NW: BMI 18.5–25.0 kg/m²) or obese weight (OB: BMI ≥30.0 kg/m²) was recruited. Participants completed a comprehensive, validated, computer-based cognition battery (IntegNeuro™) evaluating impulsivity, attention, information processing, memory and executive function domains. N-3PUFA status was assessed via the Omega-3 Index (O3I), with levels categorised as low (<4%), safe (4–8%) or optimal (>8%). Potential confounding factors of BMI, physical activity (International Physical Activity Questionnaire, IPAQ) and inflammatory status (C-reactive Protein, CRP) were adjusted for both individually and concurrently. Data reported as z-scores (mean±SD), analysis via ANOVA and ANCOVA.

Results: 299 women (NW: n = 157, 24.9 ± 4.6 y; OB: n = 142, 26.9 ± 5.4 y) completed the study. The OB had higher levels of CRP (p < 0.001) and lower IPAQ (p < 0.001). Cognitive performance was within normal ranges (±1 z-score). Most participants had an O3I in the safe (n = 278) or optimal (n = 36) range, with mean O3I higher for NW (p < 0.001). A small proportion (n = 13, 4%) had low O3I, nearly all (12/13) of whom were OB (NW: 1%; OB: 8%; p = 0.002). BMI was negatively correlated with O3I (r = -0.34, p < 0.0001). The low O3I participants had significantly lower cognitive performance across all domains (p = 0.005), with attention (p = 0.018) and memory (p = 0.037) significant on univariate tests. Confounder adjustment (CRP and BMI) attenuated significance on these domains (attention: p = 0.07; memory: p = 0.16) but the overall group difference remained (p = 0.03).

Conclusion: Obesity and a low O3I were associated with a small overall reduction in cognitive performance, although still within the normal range. The clinical importance of this finding is uncertain and investigation of a larger group of participants with low O3I is needed. **FUNDING DISCLOSURE:** This research was supported by a grant from Meat and Livestock Australia.

PO2.034

Anti-oxidant treatment improves cardiac dysfunction in ageing obese Bmal1 deficient mice

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Background & Aims: Obesity negatively affects cardiac function by inducing reactive oxygen species (ROS) in the heart. Anti-oxidant therapies have shown to be effective in decreasing cardiac dysfunction in animal models. Bmal1 (brain and muscle ARNT-like protein-1) deficient (Bmal1^{-/-}) mice develop the metabolic syndrome when exposed to a high fat diet and show an increased cardiac ROS production. In this study, we investigated whether Bmal1 deficiency in an obese setting affects cardiac function and whether ROS mediate this effect.

Objectives. To show that 1) Bmal1^{-/-} mice exposed to a high-fat and high-cholesterol diet (HFHCD) develop cardiac dysfunction; 2) anti-oxidant treatment improves their heart function. **Material & methods.** 5-weeks-old Bmal1^{-/-} and wild-type (Bmal1^{+/+}) mice were exposed to the HFHCD, and after 5 weeks, one group of each genotype received 5 mM 4-hydroxy TEMPOL in the drinking water, while another group received regular drinking water (n = 4–6). Echocardiography was used to determine cardiac function after 15 weeks HFHCD loading.

Results. Body weight gain was not affected by Bmal1 deficiency and TEMPOL treatment (Bmal1^{+/+}: 13 ± 0.73g (HFHCD) versus 9.8 ± 0.77g (HFHCD+TEMPOL); Bmal1^{-/-}: 11 ± 0.75g (HFHCD) versus 11 ± 0.65g (HFHCD+TEMPOL); p > 0.05). Echocardiographic analysis revealed that Bmal1^{-/-} hearts developed systolic dysfunction (decrease of fractional shortening and ejection fraction) as compared to Bmal1^{+/+} hearts, which was however compensated by dilation of the heart (increase of diastolic and systolic left ventricular (LV) diameter and volume) (Table 1). TEMPOL treatment in Bmal1^{-/-} mice normalized these heart function parameters (Table 1). Although cardiac ROS levels did not differ between groups, Bmal1^{-/-} versus Bmal1^{+/+} hearts had significantly more oxidatively modified residues in their telomeric DNA (0.16 ± 0.015% versus 0.096 ± 0.0095%; p = 0.003). TEMPOL significantly protected Bmal1^{-/-} cardiac telomeres from oxidation as evidenced by a reduced telomere damage score (0.11 ± 0.012% versus 0.16 ± 0.015%; p = 0.028).

Conclusion. Bmal1 deficiency induced cardiac dysfunction in an obese setting, which was improved by TEMPOL treatment, apparently in part by scavenging ROS.

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PO2.035

Insulin stimulates white adipocyte adiponectin secretion via mechanism not involving direct effects on the exocytotic machinery

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Background and Aims: Adiponectin is released from white adipocytes with insulin-sensitizing, fat-burning and anti-inflammatory properties. The increasing incidence of obesity-associated medical disorders emphasizes the importance of understanding the regulation of adiponectin secretion. A few studies have shown that insulin stimulates adiponectin release while own recent findings show, seemingly contradictory, that adiponectin exocytosis is triggered by an elevation of cAMP. Clearly, the mechanistic regulation of adiponectin secretion is not fully understood.

Material and Methods: Clonal 3T3-L1 or isolated primary mouse adipocytes were used. Secreted adiponectin at different time points (0–90

minutes) was measured with ELISA. Exocytosis was measured as increase in membrane capacitance using the patch-clamp method. Objective The objective of our studies is to study similarities and differences between adiponectin secretion/exocytosis stimulated by insulin or cAMP-elevating agents with the aim to better understand the molecular and cellular regulation.

Results: Time-course series showed that insulin (200 nM) stimulated adiponectin secretion 1.4-fold in 3T3-L1 adipocytes after 60 minutes of incubations (n = 6, p < 0.05 vs. control). The cAMP increasing agents forskolin (10 μ M) and IBMX (200 μ M) stimulated adiponectin secretion 1.5-fold after 15 minutes (n = 6, p < 0.05 vs. control).

Results: were similar using primary adipocytes. Insulin-stimulated adiponectin secretion was inhibited by pre-treatment with the PI3K inhibitor wortmannin (100 nM; n = 9; p = 0.2 vs. control) while secretion was unaffected by the PkB inhibitor Mk2206 (1 μ M, n = 7; 0.02 vs. control). Insulin did not affect intracellular cAMP levels. In patch experiments, inclusion of cAMP in the pipette solution stimulated 3T3-L1 adipocyte exocytosis, thus in agreement with own published work. Extracellular application of insulin was incapable of inducing exocytosis.

Conclusions Our results indicate that insulin stimulates adiponectin secretion by mechanisms different from how cAMP-elevating agents trigger adiponectin exocytosis. We propose that insulin induces adiponectin secretion via a cAMP-independent and PI3K-dependent pathway. We further suggest that the insulin effect is targeted up-stream from the exocytotic machinery and/or via secretion of an adiponectin vesicle pool different than the one released by cAMP.

PO2.036

White adipocyte adiponectin exocytosis is stimulated via B3 adrenergic signaling and activation of Epac1: Catecholamine resistance in obesity and type 2 diabetes

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Background & Aims: Adiponectin is a peptide hormone secreted by white adipocytes with anti-diabetic, anti-inflammatory and anti-atherogenic properties and levels are decreased in obese and type 2 diabetic individuals. Despite its discovery more than 20 years ago, the physiological regulator of adiponectin exocytosis remains elusive. Own recent studies show that adiponectin exocytosis is triggered by intracellular cAMP via activation of Exchange Proteins directly Activated by cAMP (Epac) while Ca^{2+} is important to potentiate exocytosis. We thus hypothesized adrenergic signaling to be a regulator of adiponectin exocytosis. **Material & Methods:** Membrane capacitance patch-clamp recordings and biochemical measurements were combined to investigate effect of adrenaline or the β_3 adrenergic agonist CL 316,243 (CL) adiponectin exocytosis/secretion. 3T3-L1 and primary subcutaneous adipocytes from mice fed chow or high fat diet (HFD) for 8 weeks were used.

Objectives: Our aim was to investigate the physiological regulation of adiponectin exocytosis in health and metabolic disease.

Results: The β_3 adrenergic receptor (AR) was highly expressed in cultured and primary adipocytes while other ARs were detected at lower levels. 3T3-L1 and primary adipocytes expressed Epac1 (Epac2 was undetectable). Extracellular application of adrenaline (5 μ M) or CL (1 μ M) to 3T3-L1 adipocytes infused with a non-stimulatory pipette solution (0 cAMP) stimulated exocytosis and the maximal rate amounted to 19 fF/s (n = 6) and 17 fF/s (n = 8), respectively. Adrenaline or CL stimulated adiponectin secretion ~1.8- and 2-fold respectively in 3T3-L1 and primary adipocytes (n = 9–13; P < 0.05 vs. control). Adrenergically stimulated adiponectin exocytosis/secretion was inhibited by the Epac-inhibitor ESI-09 (10 μ M). Interestingly, adrenergically stimulated adiponectin release was completely abolished in adipocytes isolated from HFD-fed mice. Expression of β_3 -AR and Epac1 was 5- and 1.8-fold downregulated respectively in HFD adipocytes compared to chow.

Conclusion: We propose that adiponectin exocytosis is stimulated via adrenergic signaling pathways mainly involving β_3 -ARs. We further suggest that adrenergically stimulated adiponectin secretion is disturbed in obesity/type 2 diabetes largely due to reduced expression of β_3 -ARs and Epac1 in a state we define as catecholamine resistance.

Table 1. Effect of genotype and TEMPOL treatment on cardiac function in Bmal1^{-/-} and Bmal1^{+/+} mice on a high-fat and high-cholesterol diet (HFHCD)

Data are means \pm SEM for n animals. Abbreviations are: diastole (d); systole (s); left ventricle (LV); LV internal diameter (LVID); fractional shortening (FS); LV end-diastolic volume (EDV); LV end-systolic volume (ESV); and ejection fraction (EF). • p < 0.05 versus untreated mice; † p < 0.05 versus Bmal1^{+/+} mice (Mann-Whitney).

	Bmal1 ^{+/+}	Bmal1 ^{+/+}	Bmal1 ^{-/-}	Bmal1 ^{-/-}
	HFHCD	HFHCD+ TEMPOL	HFHCD	HFHCD+ TEMPOL
n	7	4	6	6
LVIDd (mm)	4.2 \pm 0.044	4.2 \pm 0.18	4.8 \pm 0.16†	4.4 \pm 0.13•
LVIDs (mm)	2.9 \pm 0.077	2.9 \pm 0.16	3.6 \pm 0.13†	3.1 \pm 0.18
FS (%)	32 \pm 1.8	32 \pm 2.3	26 \pm 1.2†	30 \pm 2.6
EDV (ul)	40 \pm 1.3	40 \pm 5.1	61 \pm 6.0†	44 \pm 4.0•
ESV (ul)	13 \pm 0.99	13 \pm 2.0	24 \pm 3.0†	16 \pm 2.9
EF (%)	68 \pm 2.4	68 \pm 3.2	60 \pm 1.9†	65 \pm 3.8

PO2.037

Obesity as a risk factor for the development of thrombotic thrombocytopenic purpura in {Adams13} deficient mice

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Background and Aims: Thrombotic thrombocytopenic purpura (TTP) is characterized by severe thrombocytopenia, hemolytic anemia and disseminated microvascular thrombosis leading to organ failure and death. Recent studies have suggested that obesity might be a risk factor for TTP. We have investigated this using an ADAMTS13 deficient (Adams13^{-/-}) mouse model.

Objectives: To examine whether obese Adams13^{-/-} mice are more susceptible for TTP development than their lean counterparts.

Material/Methods: Adams13^{-/-} and wild-type (WT) mice were kept on a standard fat diet (SFD, lean) or a high fat diet (HFD, obese) for 15 weeks, and recombinant human von Willebrand factor (rVWF) was injected to trigger TTP. Blood samples were taken after 24h to monitor TTP characteristics.

Results: Lean Adams13^{-/-} mice triggered with a threshold concentration of 250 U/kg rVWF did not develop TTP, while typical TTP symptoms developed in obese Adams13^{-/-} mice. Obese Adams13^{-/-} mice as compared to their lean counterparts indeed had severe thrombocytopenia (35 \pm 13 $\times 10^3$ versus 803 \pm 113 $\times 10^3$ platelets/ μ L, p = 0.0001) and higher LDH levels (630 \pm 123 mU/mL versus 329 \pm 57 mU/mL; p < 0.05). These effects of rVWF injection were also seen in obese WT controls, but were more pronounced in obese Adams13^{-/-} mice. Endogenous mouse VWF antigen levels were higher after HFD as compared to SFD in WT (1.7-fold) as well as Adams13^{-/-} mice (1.5-fold) without marked effects of genotype. Hemoglobin and hematocrit levels were not different for obese and lean Adams13^{-/-} mice, not supporting hemolytic anemia. Analysis of schistocytes in blood smears did show an increase after HFD as compared to SFD feeding for both genotypes (about 1.7-fold), but no difference between WT and Adams13^{-/-} mice.

Conclusion: Obese Adams13^{-/-} mice are more susceptible to induction of acute episodes of TTP than lean mice. **Acknowledgment:** We thank D. Bateurs, S. De Meyer, C. Tersteeg, C. Vranckx and I. Vorsters for helpful contributions and H. Rottensteiner (Baxalta, Vienna, Austria) for provid-

ing the rVWF. Adamts13-/- mice were a gift of D. Ginsburg (Ann Harbor, MI).

PO2.038

Adipose tissue gene expression is differentially regulated with different rates of weight loss in overweight and obese humans

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Background & Aims: Moderate weight loss can ameliorate adverse health effects associated with obesity, reflected by an improved adipose tissue (AT) gene expression profile. However, the effect of rate of weight loss on the AT transcriptome is unknown.

Objectives. We investigated the global AT gene expression profile before and after two different rates of weight loss that resulted in similar total weight loss, and after a subsequent weight stabilization period. Material & methods. In this randomized controlled trial 25 male and 28 female individuals (BMI: 28–35 kg/m²) followed either a low-calorie diet (LCD; 1250 kcal/d) for 12 weeks or a very-low-calorie diet (VLCD; 500 kcal/d) for 5 weeks (weight loss (WL) period) and a subsequent weight stable (WS) period of four weeks. The WL period and WS period together is termed dietary intervention (DI) period. Abdominal subcutaneous AT biopsies were collected for microarray analysis and gene expression changes were calculated for all three periods in the LCD group, VLCD group and between diets (Δ VLCD- Δ LCD).

Results. Weight loss was similar between groups during the WL period (LCD: -8.1 ± 0.5 kg, VLCD: -8.9 ± 0.4 kg, difference $p = 0.25$). Overall, more genes were significantly regulated and changes in gene expression were more extreme in the VLCD group compared to the LCD group. Gene sets related to mitochondrial function, adipogenesis and immunity/inflammation were more strongly upregulated on a VLCD compared to a LCD during the DI period (positive Δ VLCD- Δ LCD). Neuronal and olfactory related gene sets were decreased during the WL period and DI period in the VLCD group.

Conclusion. The rate of weight loss (LCD vs. VLCD), with similar total weight loss, strongly regulates AT gene expression. Increased mitochondrial function and adipogenesis on a VLCD compared to a LCD reflect potential beneficial diet-induced changes in AT, while differential neuronal and olfactory regulation suggest functions of these genes beyond the current paradigm.

PO2.039

NAFLD in Asian Indians: Querying the role of composition and volumes of subcutaneous adipose tissue compartments using 1H-MRS

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Background & Aims: Visceral adiposity is a risk factor for NAFLD. The role of subcutaneous fat compartments has not been elucidated in NA-

FLD. This study was undertaken to assess the relationship of superficial and deep subcutaneous adipose tissue compartments with NAFLD.

Objectives: This cross sectional study evaluated the association of abdominal fat compartments with anthropometric, biochemical measurements and insulin resistance in patients with and without NAFLD. We also compared the fatty acid composition of superficial (SSAT) and deep (DSAT) subcutaneous adipose tissue in the two groups.

Material/Methods: Anthropometry, fasting plasma glucose (FPG), serum lipids and serum insulin, were measured in 39 subjects with NAFLD (cases) and 21 subjects without NAFLD (controls). Volumes of SSAT, DSAT and visceral fat (VAT) were obtained using single slice 3T MRI at L3- L4 level in 21 cases and 21 controls. Fatty acid composition of SSAT and DSAT was determined by magnetic resonance spectroscopy with voxel placed at L3-L4 using TR= 2000ms, TE= 30/50/80/135/200ms with 64 scans.

Results: Cases showed significantly higher levels of FPG, total cholesterol, triglycerides and VLDL as compared to controls ($P < 0.05$). DSAT volume among cases (83.3 ± 3.79) was significantly higher than controls (64.6 ± 5.1 , $p = 0.007$) after adjusting for age and BMI. SSAT/DSAT ratio was higher among controls ($p < 0.001$). On 1H-MRS, among cases significantly higher total fat was seen in the DSAT compartment than in SSAT. Correlation analysis showed BMI and waist-to-height (WHtR) ratio as best predictors of abdominal fat volumes, with WHtR performing slightly better among controls. SSAT volume correlated positively with HDL and negatively with ALT levels. Fasting insulin correlated positively with VAT volume among cases.

Conclusion: These observations suggest that subcutaneous fat is not homogenous and differences in DSAT volumes and composition may play a significant role in the pathogenesis of NAFLD.

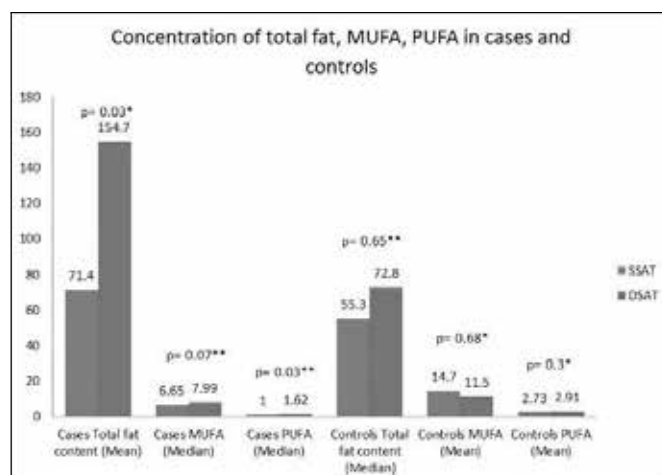


Fig. 1. Bar diagram depicting concentrations of total fat, MUFA and PUFA among cases and controls in SSAT and DSAT

The respective p values are depicted above the graphs. Among cases, there is significantly higher total fat and PUFA content in the DSAT than SSAT. (SSAT= Superficial subcutaneous adipose tissue, DSAT= deep subcutaneous adipose tissue, PUFA= poly unsaturated fatty acid, MUFA= mono unsaturated fatty acid, *p value by paired t test, **p value by Wilcoxon signed ranks test)

Tab.1. Comparison of anthropometric, biochemical and adipose tissue volume parameters between cases and controls
*p value adjusted for BMI and age. ** p value by median test. *** Mean \pm SE. HO-MA-IR= Homeostatic Model Assessment- Insulin Resistance. SSAT= superficial subcutaneous adipose tissue. DSAT= deep subcutaneous adipose tissue. VAT= visceral adipose tissue.

Parameter	Cases (n = 39)	Controls (n = 28)	p value
Age in years	38.4 \pm 6.6	35.0 \pm 6.0	0.03
Females	21 (54%)	18 (64%)	0.45
Family history of diabetes	19(49%)	4(14%)	0.003
BMI (kg/m ²)	29.5 \pm 4.1	27.4 \pm 3.1	0.03
Waist to hip ratio	0.99 \pm 0.07	0.93 \pm 0.07	0.006
Waist to height ratio	0.65 \pm 0.07	0.61 \pm 0.05	0.003
Fat mass (kg) by bioelectric impedance	24.2 \pm 8.05	18.7 \pm 7.9	0.008
Alanine aminotransferase (IU/L)	50.6 \pm 27.5	23.3 \pm 9.47	<0.001
Fasting blood glucose (mg/dL)	101.6 \pm 13.4***	93.7 \pm 9.51***	0.02*
Total cholesterol (mg/dL)	193 \pm 33.8***	169.6 \pm 26***	0.01*
Triglycerides (mg/dL)	171.3 \pm 71.2***	137.9 \pm 44.5***	0.05*
Mean arterial pressure (mm Hg)	97.2 \pm 6.9***	90.9 \pm 10.6***	0.04*
hsCRP (mg/L) Median (min- max)	3.44 (0.05–10) n = 34	2.05 (0.3–10) n = 19	0.05**
HOMA-IR Mean \pm SD (fasting insulin* fasting plasma glucose/22.5)	3.24 \pm 2.2 n = 34	2.09 \pm 1.1 n = 19	0.02
SSAT volume (mm ³)	69.4 \pm 5.0***	58.6 \pm 3.7***	0.11*
DSAT volume (mm ³)	83.3 \pm 3.79***	64.6 \pm 5.1***	0.007*
SSAT/ DSAT (ratio)	0.71 \pm 0.04***	1.12 \pm 0.05***	<0.001*
VAT volume (mm ³)	85.9 \pm 4.5***	51.9 \pm 6.1***	<0.001*

PO2.040

The effects of morbid obesity, super obesity and reverse trandelenburg position on respiratory mechanics in patients underwent laparoscopic sleeve gastrectomy operations under total intravenous anesthesia

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Background and Aims: Obesity has deteriorating effects on respiratory functions. Propofol and Remifentanyl have rapid action and clearance properties during total intravenous anesthesia. Due to limited liver and kidney functions in obese patients these drugs have advantages with organ free elimination and minor residual effects. The aim of this study is to evaluate the effects of morbid and super obesity and surgical positions on respiratory mechanics during laparoscopic sleeve gastrectomy operations. **Materials/Methods:** After local ethic committee approval, total of 80 patient, 18–65 years old, physical status ASA I-II, Morbid obese (BMI > 40), scheduled for laparoscopic sleeve gastric operation were enrolled in this study. The patients were divided into two groups, each of which included 40 patients (a morbidly obese group and a super obese group) undergoing laparoscopic sleeve gastrectomy procedure. Patients were monitored with electrocardiogram, oxygen saturation and non-invasive arterial pres-

sure, Bi-spectral index (BIS) neuromuscular monitoring Train of Four (TOF) and respiratory mechanics (Airway Compliance, peak, plateau and mean airway pressures and Resistance) was applied. Patients were not pre-medicated. Anesthesia induction was made with propofol 2 mg / kg, Rocuronium 0.6 mg / kg. All drugs were administered according to corrected body weight calculation. Patients were orotracheal intubated and patients were mechanically ventilated with Volume control mode 6 ml/kg tidal volume and 12–14 / min frequency and PEEP: 8 cm H₂O parameters. General anesthesia maintained with propofol 8–10 mg / kg / h, remifentanyl 0.25 mcg / kg / min infusions. Respiratory mechanics, hemodynamic variables were recorded 10 minutes after anesthesia induction after reverse Trendelenburg positioning, after pneumoperitoneum, before desufflation, after neutral positioning and before extubation.

Results: There is no statistically significant difference between the age and gender according to group of patients. In super obese group dynamic airway compliance were significantly lower while airway resistance were greater in super obese group when compared with morbid obese group. Hemodynamic variables were altered in both groups and there were no significant difference found among the groups.

Conclusion: Super obesity found to have much deteriorating effects on respiratory mechanics when compared with morbid obesity.

PO2.041

Evaluation of gut microbiota in obese patients with sleeve gastrectomy

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Background & Aims: Gut microbiota plays an important role in the maintenance of host's homeostasis and it has been suggested that may mediate some of the beneficial effects of bariatric surgery. Objectives: The aim of this study was to assess gut microbiota and fat fecal excretions in obese with and without bariatric surgery (after 2 years) and in healthy control subjects.

Materials & Methods: Gut microbiota was investigated in three groups: 1) obese with sleeve gastrectomy (N = 17; 5M:12W, 39 \pm 9y, 37 \pm 9 kg/m²), 2) obese (N = 17; 10M:7W, 37 \pm 11y, 45 \pm 7 kg/m²) and 3) control subjects (C) (N = 15; 5M – 10F, 38 \pm 14 years, 22 \pm 3 kg/m²). Bacteroidetes, Firmicutes, Bifidobacterium, Lactobacillus fecal concentrations were evaluated with both real-time PCR and microbiological techniques; fecal SCFA were quantified with gas chromatography. In addition, habitual food intake was evaluated by food frequency questionnaire.

Results: Bacterial counts and fecal SCFA concentrations did not differ among these three groups. Energy intake was lower in SG than OB and C (SG=1413 \pm 526 kcal vs OB=2256 \pm 815 kcal and C=2189 \pm 218kcal; p = 0.03). Macronutrients diet composition was adjusted for energy and we found that carbohydrate intake was higher in OB and C as compared to SG (OB=129 \pm 20 g and C=135 \pm 18 g vs SG=108 \pm 23; p = 0.01); whereas fat intake was higher in SG compared to both OB and C (SG=45 \pm 8 g vs OB=34 \pm 8 g and C=34 \pm 7 g; p < 0.01).

Conclusions: In this observational study, we observed some differences in dietary intake not paralleled by gut microbiota changes at least in the species evaluated in these groups of patients and controls from the south Italy. Further studies are required to evaluate the effect of different bariatric surgery procedures on the relationship between weight loss and gut microbiota.

Predominance of glycolytic lactate production from 14C-glucose over oxidative lipogenesis in isolated epididymal rat adipocytes

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Background: Adipocytes glycolyze (under normoxic conditions) huge amounts of glucose to lactate (and glycerol). This is also observed in vivo: WAT masses produce lactate, in agreement with its low oxygen consumption. The massive production of lactate may be related to the maintenance of glycaemia. In order to prove the glucose origin of lactate, we developed precise specific methodology to trace the conversion of 14C-glucose in the medium to lactate using rat adipocyte cell cultures. **EXPERIMENTAL:** Adipocytes, freshly obtained from epididymal WAT, were incubated with 14C-glucose at physiological conditions for 24h. Label distribution was analyzed through cell isolation (which implied lipid extraction, saponification and counting of cell debris, fatty acid soaps and glycerides' glycerol). Lactate in the medium was separated and counted by minimal-volume ion-exchange chromatography using fast centrifugation tubes. Glucose was oxidized to gluconate and its specific label measured. Careful accounting and maintenance of minimal volumes allowed the quantitative analysis of label distribution in the above-indicated fractions. Cell and lipid mass, as well as glucose and lactate levels in the medium were also measured and specific activities calculated. **Results:** AND **Discussion:** The results obtained from the application of the combined study of label fate are in agreement with the known high production of lactate even under normoglycemic conditions. We found that about 46% of the label remained as glucose after 24h, 44% was found in the form of lactate and, probably, other 3C fragments; 5% was incorporated into cell fat, of which 2% went to fatty acids and 2% to glycerides' glycerol. In spite of a largely glycolytic drive, about 1% of label was lost as CO₂ through oxidative processes linked to lipogenesis.

Conclusion: Isolated rat adipocytes used glucose mainly to produce lactate through anaerobic glycolysis, but part of the glucose label found its way into fatty acids. Under the normoxic conditions tested, both anaerobic glycolysis and oxidative lipogenesis coexisted in the same adipocytes at the same time, draining the medium glucose both ways.

The role of caveolae in white adipocyte adiponectin exocytosis

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Background & Aims: The hormone adiponectin, involved in regulation of whole body energy homeostasis, is exclusively secreted by white adipocytes. Circulating levels of adiponectin inversely correlate with insulin resistance and type 2 diabetes. The mechanisms regulating adiponectin exocytosis are not completely clarified, but in caveolin-1 (Cav-1) knock-out mice plasma levels of adiponectin are reduced. Here we aim to clarify the involvement of caveolae in adiponectin release. **Material & Methods:** Freshly isolated, mature human or rodent adipocytes were used. Adiponectin content and localisation was visualized using immunohistochemistry, total internal reflection fluorescence (TIRF) microscopy, or western blot. Adiponectin secretion was measured by ELISA.

Objectives: The objectives are to unravel the role of caveolae in the mechanisms controlling white adipocyte adiponectin exocytosis.

Results: In human white adipocytes 12% of adiponectin was associated with the plasma membrane and to a class of high-density-caveolae, earlier reported to be associated with metabolic function. Substantial amounts of adiponectin were also found in the microsomal (40%) and cytosolic fractions (40%) of adipocytes. Caveolae-localized adiponectin was readily degraded by trypsin, demonstrating that adiponectin was largely bound to the cytosolic face of the caveolae membrane. Using mouse subcutaneous adipocytes we found that short-term (30 min) adiponectin release was blunted when caveolae was abrogated by methyl- β -cyclodextrin (β -cdex). Insulin stimulated release was 1.6-fold in control cells and completely abrogated in β -cdex-treated adipocytes. An elevation of cAMP stimulated secretion 3-fold in control cells but only 1.3-fold in β -cdex-exposed cells. ($n = 9-11$; three animals). TIRF microscopy implies that a fraction of the membrane-near adiponectin is co-localized with Cav-1.

Conclusion: Our findings indicate that caveolae may have a critical role in adiponectin exocytosis.

Fat mass and muscle mass show opposite relationships with physical performance in older obese type 2 diabetes patients: Baseline data PROBE trial

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Background & Aims: Evidence on the relationship between physical performance and body composition is inconsistent. We were interested in this (cross-sectional) relationship within the older obese type 2 diabetes patients participating in a lifestyle program and protein supplementation trial (PROBE).

Objectives: Evaluate to what extent physical performance is related to body composition at baseline in older obese type 2 diabetes patients. **Material & Methods:** Baseline data of 60 obese older adults (age 66.2 ± 5.5 years and BMI 33.3 ± 5.0 kg/m²) with type 2 diabetes or pre-diabetes (HbA1c >43 mmol/l) and not using insulin, were included in the analysis. We measured fat mass [FM], and percentage [FM%], lean mass [LM], and percentage [LM%], appendicular skeletal muscle mass [ASM], and arm [AMM] and leg muscle mass [LMM] using whole body DXA scan. Physical performance parameters were isometric handgrip strength [HG], 10-RM leg press [LP], knee extension power [KEP], steep ramp cycle ergometry maximal power [Wmax], 4m usual gait speed [GS], and 5x chair stand [5CS]. Stepwise linear regression analysis was applied to evaluate the relationship between physical performance and body composition, including adjustment for sex and age. Only significant beta values were reported.

Results: HG was negatively (-0.609) related to FM% and positively (+2.62) related to AMM ($R^2=0.616$). LP was related to FM% (-2.35) and LM (+1.656) ($R^2=0.365$, including age). KEP was related to FM% (-14.24) and ASM (+15.32) ($R^2=0.726$, including age and sex). Wmax was related to FM% (-6.72) and LM (+4.30) ($R^2=0.737$, including sex). GS (-0.009; $R^2=0.159$) and 5CS (+0.137; $R^2=0.230$) were related to FM; but not with muscle mass indices.

Conclusion: Physical performance appears to be negatively related to fat mass indices as well as positively related to muscle mass indices in older obese type 2 diabetes patients. This finding is in support of weight loss targeting fat reduction as well as muscle preservation in this vulnerable group.

Efficacy of usg guided tap block after laparoscopic sleeve gastrectomy, randomized controlled study

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Background and Aims: It is difficult to use traditional multimodal analgesic drugs like opioids and NSAIDs in morbid obese patients. opioids increase many risks like sedation, immobilization, hypoventilation and deepen the sleep apnea, and incidence of nausea and vomiting. USG guided TAP block is new peripheral block technique which highly becoming a part of the multimodal analgesia after surgery because of its effectiveness and advantages than other analgesic techniques. Our hypothesis is tap block is the part of multimodal analgesia strategy and successfully decreases the visual analog score and opioid consumption after bariatric surgery.

Material/Methods: 48 patient between 18–65 years old, physical status ASA I-II, Morbid obese (BMI > 35), scheduled for laparoscopic sleeve gastric operation were enrolled. Anesthesia induction made by propofol 2 mg / kg, Rocuronium 0.6 mg / kg. Orotracheal intubated patients began to mechanical ventilation with 6 ml / kg tidal volume and 12 / min frequency and PEEP: 8 cm H₂O parameters. During maintenance of anesthesia propofol 8–10 mg / kg / h, remifentanyl 0.25 mcg / kg / min.. Immediately after the surgical procedure TAP block applied the group TAP under general anesthesia and nothing done the group NON TAP. Providing real-time ultrasound image with the appropriate emission monitoring, local anesthetic solution was injected. Local anesthetic concentration of 1.5 mg / kg 0.5% bupivacaine completed 20-mL, two syringe was prepared. Concentrations were prepared based on the corrected weight of the patient's. It was applied to both right and left abdominal wall.

Results: In non TAP group VAS resting and VAS motion levels at 30 min, 2 hours, 6 hours, 12 hours and 24 hours was significantly higher than TAP group (p < 0.01). In group nontap, 30 min 2 hours, 6 hours, 12 hours and 24 hours the number of demanded bolus and given bolus, was significantly higher than Group TAP (p < 0.01). The total amount of tramadol consumption in nontap group was statistically significantly higher (p < 0.01) than TAP group.

Conclusion: TAP Block is an effective method to decrease the opioid consumption for pain relief after laparoscopic sleeve gastrectomy operations.

Copy number variation (CNV) analysis and mutation analysis of the 6q14.1 – 6q16.3 genes {SIM1} and {MRAP2} in Prader Willi {like} patients

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Background: Prader-Willi syndrome (PWS), caused by a paternal defect on 15q11.2 – q13, is the most common form of syndromic obesity. However, patients clinically diagnosed with PWS do not always show this defect on chromosome 15q and are therefore molecularly categorized as Prader Willi like (PWL). Deletions at 6q14.1 – q16.3 encompassing MRAP2 and SIM1 were reported in some individuals with a PWL phenotype. In addition, a few mutations in SIM1 and MRAP2 were also previously identified in cohorts of obese individuals. Therefore, we decided to perform copy number variation analysis of the 6q14.1 – 6q16.3 region followed by mutation analysis of SIM1 and MRAP2 in a PWL cohort.

Methods: A genome-wide microarray analysis was performed in a group

of 109 PWL patients. Next, we screened 94 PWL patients for mutations in SIM1 and MRAP2 using high-resolution melting curve analysis and Sanger sequencing. Additionally, 363 obese children and adolescents were screened for mutations in MRAP2.

Results: No gene harboring deletions were identified at the 6q14.1 – q16.3 region in the 109 PWL patients. SIM1 mutation analysis resulted in the identification of one very rare nonsynonymous variant p.P352S (rs3734354). Another rare nonsynonymous variant, p.A40S, was detected in the MRAP2 gene. No variants were identified in the 363 obese individuals.

Conclusions: In contrast to literature reports, no gene harboring deletions were identified in the SIM1 and MRAP2 regions in our PWL cohort. Secondly, taking into account their very low minor allele frequencies in public sequencing databases and the results of in silico prediction programs, further functional analysis of p.P352S found in SIM1 and p.A40S found in MRAP2 is useful. This would provide further support for a possible role of SIM1 and MRAP2 in the pathogenesis of the PWL phenotype albeit in a limited number of patients.

Comparative study on the association of lipid accumulation product and body mass index with insulin resistance, oxidative stress and sub-clinical inflammation in type 2 diabetic patients

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Background and Objective: Lipid accumulation product (LAP) is a novel biomarker of central lipid accumulation related to risk of diabetes and cardiovascular disease. In this study, we compared the association of LAP and body mass index (BMI) with oxidative stress index and sub-clinical systemic inflammation in diabetic patients.

Methods: In a cross-sectional study, 39 men and 47 women with diagnosed type 2 diabetes were assessed for anthropometrics and biochemical measurements. LAP was calculated as [waist circumference (cm) - 65] × [triglycerides (mmol)] in men, and [waist circumference (cm) - 58] × [triglycerides (mmol)] in women. Associations of LAP and BMI with serum levels of malondialdehyde (MDA) and high-sensitive C reactive protein (hs-CRP) as well as homeostatic model assessment of insulin resistance (HOMA-IR), were assessed using the partial correlation test adjusted for age, sex, fasting glucose levels, anti-diabetic and anti-lipidemic drugs.

Results: Mean age of participants was 53.6 ± 9.6 years. Mean of LAP and BMI were 51.9 ± 31.2 and 30.2 ± 5.2 kg/m², respectively. After adjustment of potential confounding variables, a significant positive correlation was observed between LAP index with HOMA-IR (r = 0.31, P < 0.05), MDA (r = 0.65, P < 0.001) and hs-CRP levels (r = 0.27, P < 0.01). BMI had significant correlations with HOMA-IR (r = 0.29, P < 0.05) and hs-CRP levels (r = 0.40, P < 0.01).

Conclusion: Compared to BMI, LAP had greater correlation with lipid peroxidation index; BMI rather than LAP was correlated with hs-CRP, and the association of both BMI and LAP with HOMA-IR were similar.

Absence of an effect of liposuction on serum adipokine concentration in normal-overweight subject

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The principle of liposuction is to remove fat through very small skin incisions, using atraumatic and blunt-tipped cannulas and effectively contour excessive fatty deposits. The metabolic effects of liposuction are unclear because the results of existing studies have varied. The purpose of the present study was to determine the effect of abdominal liposuction on C-reactive protein (CRP) as well as leptin, adiponectin, resistin, visfatin concentration. The study was approved by the Local Ethics Committee of the Pomeranian Medical University. The study was conducted with 10 women with a median age of 40 years (range, 22 to 60 years) with BMI value = 25.15. No evidence of other serious illnesses or organ dysfunction was found after the subjects had completed a comprehensive medical evaluation, which included a history and physical examination, electrocardiography, standard blood and urine tests, and an oral glucose-tolerance test. Each subject's body composition was assessed and blood sample venous blood samples were collected before and three month after the liposuction surgery using vibrating method. An electrical bioimpedance method (using a Jawon Medical X-Scan Plus II body composition analyzer) was used to estimate body composition parameters. The serum levels of CRP, adiponectin, leptin, visfatin, and resistin were measured by immune-enzymatic assays using commercially available ELISA kits (R&D Systems, Abingdon, UK), according to the manufacturer's instructions. At baseline, all subjects displayed normal body weight or overweight. After an average lipo-aspirate of 2.9 l a significant decline in body mass, BMI, subcutaneous and visceral fat mass was observed. Liposuction decreased body weight and body-mass index because of a marked decrease in body fat. The decrease in measured fat mass (from 29.88 ± 6.11 to $25.67 \pm 3.2\text{kg}$) was consistent with the amount of fat aspirated during liposuction. Liposuction decreased the volume of subcutaneous adipose tissue by 25 percent and volumes of visceral adipose tissue by 30 percent. Liposuction did not significantly alter the concentrations of circulating adipokines or of C-reactive protein. Our results indicate that liposuction removal of abdominal subcutaneous adipose tissue in normal-overweight subject should not, by itself, be considered a clinical therapy for obesity and cannot replace diet and sport.

PO2.049

Evaluating Illumina methods to explore the microbiota in saliva samples to predict the risk of obesity

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A large scale study testing the proposed link between obesity and the microbiome relies on well developed methodology. Such studies, exploiting culture-independent molecular techniques and advances in next generation sequencing (NGS) technologies, are now feasible. A challenge using NGS is to determine the sequence depth that ensures the sufficient power to detect the difference in microbiomes and ensure high reproducibility and repeatability of the method. Protocols need to be devised to prepare high quality libraries for Illumina sequencing and thereby improve the sequencing quality and depth. This study aimed to compare the performance of two Miseq DNA library preparation kits Nextera and Truseq with and without modified primers. Four saliva samples in triplicates were sequenced with Illumina Miseq platform using Nextera and Truseq with modified primers. The primers S-D-Bact-0341-b-S-17 and S-D-Bact-0785-a-A-21 were used to amplify 16S rRNA V3-V4 region producing a 464 bp long amplicon. Primers were modified by adding Illumina-compatible adapter tails to the 5'-end of the primer. Primers having internal index/molecular barcode between the locus specific part and adapter tail were also tested. All the four samples (triplicate) were tested with both primers sets (with and without internal index, ii) and almost all the samples were successfully sequenced (with two exceptions). The truseq kit with primer modified by internal indices delivered the comparatively high sequence depth of minimum 8048 reads/sample. Nextera with and without modified primer failed to provide minimum sequence depth for

the saliva samples. Thus Truseq with modified primers can be considered the most effective protocol to produce a large number of sequences. In addition, analyses of technical replicates identify the reproducibility and repeatability of the method. These factors will be taken into consideration in design of a large scale study of the association between the microbiome and obesity.

PO2.050

Portal and mesenteric vein thrombosis: Case series among 3000 bariatric cases; our experience in Qatar and future path to decrease its incidence

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Introduction: Portal and mesenteric vein thrombosis is relatively rare but potentially life threatening complication following bariatric surgery. A high index of suspicion is crucial for identifying and treating this complication. Aims and

Objectives: to look at special surgical technique that can decrease the incidence of venous thrombosis. Generate a guideline for thrombophilia patients undergoing bariatric surgery.

Material/Methods: 5 cases of portal and mesenteric vein thrombosis have been identified and analyzed in our records over 5 years in the metabolic and bariatric center in Qatar in terms of mean preoperative BMI, history of DVT, intraabdominal pressure, surgeon experience, post operative hydration, causes of hypercoagulability and development of late postoperative complications.

Results: 4 females and one male were included with average age of 44 years. All cases were diagnosed with CT and presented 19 days post operatively (5–30 days). 4 out of 5 patients had identifiable causes of thrombosis including: recurrent DVT, hyperhomocysteinemia, Factor V deficiency, SLE, Protein C and S deficiency. One of the patients needed a surgical resection of small bowel due to ischemia while the remaining was managed medically with anti-coagulation.

Conclusion: Most of the cases of portal and mesenteric vein thrombosis are of unknown causes in the bariatric patients; our case series showed that our patients had identifiable causes of thrombosis; this is reflective of the fast operative time; lower intra-abdominal pressure and appropriate anti-coagulation.

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PO2.051

The Effect of Muscular Lipid Accumulation on Isolated Skeletal Muscle Contractility

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Background & Aims: Muscular lipid accumulation has been demonstrated to affect important regulators of metabolic capacity (Corcoran et al, 2007), insulin sensitivity (He et al, 2001) and the maintenance and regeneration of contractile proteins (Akhmedov & Berdeaux, 2013). Despite this evidence there is distinct lack of research quantifying the effect of

muscular lipid accumulation on the mechanical performance of skeletal muscle.

Objectives: This study used whole skeletal muscle isolations to assess if lipid accumulation had an effect on contractile performance in a muscle specific manner.

Material/Methods: Following a 16 week high calorific feeding regime, soleus, EDL and diaphragm were isolated from 20 week old female mice. Isometric stress, activation and relaxation times, work loop power and fatigue resistance were measured and compared to a lean control group (fed standard lab chow).

Results: The treatment group demonstrated a significant increase in body mass, fat pad mass and muscle mass without a change in muscle length, indicating greater muscle lipid content. When compared to the lean controls, there was no significant change in maximal isometric stress, work loop power and activation and relaxation times in soleus muscle. However, soleus did fatigue significantly faster in the obese group. For both EDL and diaphragm, maximal isometric stress and work loop power were significantly decreased in the obese group, however fatigue resistance was unchanged.

Conclusion: Results: from the present study demonstrate a muscle specific negative relationship between lipid accumulation and contractile performance. This decline in muscle performance may act as a significant barrier to physical activity and further contribute to the negative cycle of obesity.

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PO2.053

Are anti-saccharomyces cerevisiae antibodies associated with obesity and irritable bowel syndrome?

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Background & Aims: Irritable bowel syndrome (IBS) is prevalent in morbidly obese subjects. Obesity and IBS share common pathophysiological features, including immune activation. An association between antibodies against *Saccharomyces cerevisiae* (ASCA) (baker's yeast) and obesity has been suggested. Patients with IBS frequently report intolerance to products containing yeast, such as bread. This study explored associations between ASCA, obesity and IBS.

Objectives: explore associations between ASCA, BMI, waist-and hip-circumference, IBS and diet in morbidly obese subjects.

Material/Methods: Morbidly obese subjects referred to a specialized hospital unit, were included. Dietary habits were recorded with a food frequency questionnaire. Abdominal complaints were classified according to the Rome III criteria. Plasma ASCA IgA, IgG and IgM were measured with ELISA. ASCA-positivity was defined as ≥ 20 U/mL.

Results: One-hundred-and-forty-six subjects (112 female), mean (SD) age 43.0 (8.64) years and BMI 42.1 (3.81) kg/m² were included. Ninety-eight subjects had satisfactory dietary records. Thirty-five subjects (24%) were classified as having IBS, of whom 7 had IBS with constipation (IBS-C). In total 18/146 (12.3%; 95%CI: 7.5:18.8) subjects had positive ASCA values; IgG: 14 (9.6%), IgM: 4 (2.7%) and IgA: 0 (0.0%). ASCA did not correlate with IBS, IBS symptom severity or with obesity indices. IgM was significantly higher in IBS-C compared to subjects without IBS and compared to the remaining IBS-subtypes (median (range): 13.0 (33.1) versus 4.05 (39.8) and 2.75 (12.4) U/mL, both P-values <0.05). IgM

was positively correlated with the consumption of grains, but not with the consumption of bread.

Conclusion: In this study, ASCA was neither associated with degree of obesity, nor with IBS in morbidly obese subjects. The proportion of ASCA positive subjects was however high. The study therefore support that there might be a positive association between body weight and ASCA. Also, an immunological mechanism cannot be ruled out in the IBS-C subtype. The elevated IgM levels in IBS-C were not reflected by differences in the consumption of bread, a major source of dietary baker's yeast.

Acknowledgements: Thanks to Innlandet Hospital Trust, Norway for funding the study.

PO2.054

The use of 3D surface-imaging for volumetric measurement within an obese population – a feasibility study

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Background & Aims: In clinical settings, methods for assessing patient weight-loss includes measuring weight using balance scales, waist circumference using a tape measure, or subjective 'before and after' photographs, often leading to inaccuracies. Previous studies with healthy participants have shown 3D surface-imaging to improve the reliability of anatomical measurements in comparison to current methods, and thus, may be applicable to clinical weight-loss settings. The aim of the study was to determine feasibility of the system when scanning obese participants.

Objectives, Objectives: were to 1) assess the reliability of the surface-imaging system in measuring segmental volume; and 2) consider the practicality of the system in a clinical setting. **Material & methods,** After ethical approval, 62 participants enrolled on the Rotherham Institute for Obesity's (RIO) weight-loss programme aged 46 ± 14 years with a BMI of 40.4 ± 6.1 kg·m² were recruited. The scanning system comprised of four calibrated Microsoft Kinect[®] sensors, mounted in a vertical orientation. Participants' bodies were palpated and marked using six coloured circular markers, enabling the torso segment to be located in the colour mapped 3D scans. Body stabilisation and breathing techniques were used to reduce postural sway and involuntary movements, aiding scan reliability. Three surface-images were recorded per person, which were manually digitised by a single operator. Volume was calculated using custom-written automated algorithms and reliability assessed using intra-class correlation coefficients (ICC 2,1) and technical error of measurement (TEM).

Results, High intra-scan reliability was found (TEM = 0.64%); in excess of the International Society for the Advancement of Kinanthropometry (ISAK) level 1 requirements- TEM < 1%. An ICC of > 0.99 was found, meeting recommendations for clinical acceptability. Compared to current methods, the system reduces assessment time and physical contact between patient and practitioner, which was stated as positive by participants.

Conclusion, Findings demonstrate that the scanning system is a reliable method of assessing segmental volume of obese individuals, whilst improving upon current clinical methods. Future studies should investigate the use of the scanning system within clinical settings to measure and aid weight-loss.

Acknowledgements: We would like thank participants and staff at RIO, Rotherham, UK.

Table 1. Table 1. Baseline characteristics of the patients.

	Control	Obese
Male/female (n)	7 (0/7)	20 (7/13)
Age (years)	41.86 \pm 10.7	50.88 \pm 9.4
Body weight (Kg)	57.29 \pm 4.6	113.38 \pm 19.2**
BMI (Kg/m ²)	22.31 \pm 1.4 42.13 \pm 5.5	42.13 \pm 5.5**

Study of Autonomic functions in patients of Non Alcoholic Fatty Liver Disease

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Background & Aims: The pathogenesis of NAFLD involves insulin resistance and hyperleptinemia, which are related to atherosclerosis and autonomic changes. The effect of NAFLD on autonomic changes has been less reported. This study was undertaken to assess the association of NAFLD with autonomic functional changes independent of conventional cardiovascular risk factors.

Objectives: This cross sectional study evaluated and compared autonomic functions among NAFLD patients with and without type 2 diabetes. This study also correlated autonomic functions with subclinical inflammation, insulin resistance and measures of adiposity in these groups.

Material/Methods: Anthropometry, fasting and post prandial blood glucose, liver and kidney function tests, lipid profile, hsCRP and fasting insulin levels were measured in 18 subjects with NAFLD without diabetes and 12 subjects of NAFLD with diabetes. Autonomic functions were assessed by measuring heart rate variability (HRV), blood pressure variability (BPV), baroreflex sensitivity (BRS) and vascular functions by pulse wave velocity (PWV), augmentation index (AI).

Results: Subjects with NAFLD with diabetes showed comparatively higher levels of FG, total cholesterol, LDL and VLDL as compared to subjects with NAFLD without diabetes. BRS was lower than normal in 77% (14/18) NAFLD patients without diabetes as compared to 66% (8/12) NAFLD patients with diabetes ($p = \text{NS}$). Similarly, PWV was higher than normal in 45% (8/18) NAFLD patients without diabetes compared to 41% (5/12) NAFLD patients with diabetes ($p = \text{NS}$).

Conclusion: These observations suggest that NAFLD may be associated with autonomic and vascular dysfunction even in the absence of type 2 diabetes, thereby increasing the cardiovascular risk.

Are oxygen consumption measurements in isolated adipocytes from lean and obese subjects comparable with those in isolated mitochondria?

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Background and Aim: It is well accepted that obesity goes along with a dysregulated adipocyte function. Specifically, oxygen consumption rates of mitochondria from subcutaneous adipocytes were found to be reduced in obese subjects [1]. However, respiration measurements of complete human adipocytes in dependence of BMI have not been performed so far. Therefore our aim was to analyze mitochondrial respiration in adipocytes within their cellular context and to scrutinize if results from isolated mitochondria can be reproduced.

Material and Methods: Visceral and subcutaneous adipose tissue was collected from patients undergoing abdominal surgery. Adipocytes were isolated by collagenase digestion. Through high-resolution respirometry

(Oroboros Oxygraph-2k) respiratory states of permeabilized adipocytes were determined. Subjects were divided into three groups depending on their BMI (lean: BMI ≤ 25 ; overweight: BMI 25–30; obese: BMI > 30). Results: The gained results are in agreement with our previous findings from isolated mitochondria. Subcutaneous adipocytes show significant differences in oxidative phosphorylation (OXPHOS) capacity ($p < 0.005$) and ATP-linked respiration ($p < 0.005$) between lean and obese subjects with lower levels in the obese, but no difference in leak respiration. In contrast to the subcutaneous depot, there were no differences between any groups within the visceral adipocytes. However, respiration rates of subcutaneous adipocytes were significantly correlated to the rates of visceral adipocytes from the same subject (OXPHOS capacity: $p < 0.0001$; ATP-linked respiration: $p < 0.05$; leak respiration: $p < 0.005$).

Conclusion: Respiratory measurements in isolated subcutaneous adipocytes are in accordance with those in isolated mitochondria. Therefore, both models to assess oxygen uptake are comparable. Although oxygen consumption rates of subcutaneous and visceral adipocytes differ between lean and obese subjects, respiration between the two depots are closely associated within the same subjects.

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Sexual Dysfunction Is Common in the Obese Female and Improves after Bariatric Surgery

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Background: We aimed to assess sexual satisfaction in obese women before and after bariatric surgery using the validated Female Sexual Function Index (FSFI) and also to compare sexual satisfaction between obese and non-obese women. Frequency of female sexual dysfunction (FSD) of the participants was compared.

Methods: 60 obese women (mean initial BMI of $43.7 \pm 5.99 \text{ kg/m}^2$; mean age of 41.7 ± 10.8 years) completed the questionnaire on sexual function (FSFI) before a bariatric procedure (laparoscopic adjustable gastric banding, 22 women; gastric plication, 33 women; and biliopancreatic diversion, 5 women), 6 months and 12 months after the procedure, i.e. after substantial weight loss (final mean BMI of $35.5 \pm 5.5 \text{ kg/m}^2$). The control group consisted of 60 non-obese women (mean BMI of $22.2 \pm 1.9 \text{ kg/m}^2$; mean age of 36.4 ± 10.7 years). The FSFI assesses sexual function, with higher scores indicating better sexual function. The FSFI total score (range 2–36) of ≤ 26.55 is indicating FSD.

Results: Baseline sexual function in the preoperative obese female was significantly lower than in the control group of non-obese women ($p < 0.01$) in each domain. Average postoperative FSFI scores increased from preoperative levels in all domains, but significant improvement occurred only in the domain for desire ($p < 0.01$). The results at 6 and 12 months after surgery did not show significant differences from each other. Before surgery, 31 obese women (51.6%) had scores indicative of FSD, while by 6 months postoperatively it was only 17 women (39.5%), and by 12 months postoperatively, 18 women (41.9%), had scores indicative of FSD. In the control group of non-obese women, only 9 women (15%) had scores indicative of FSD. The FSFI total scores improved 12 months after surgery from 20.1 ± 11.7 to 23.7 ± 11.5 , but the FSFI total score in the control group of non-obese women was 30.3 ± 3.5 ($p < 0.01$).

Conclusion: Women seeking bariatric surgery are obviously a population with substantial sexual function impairment, with nearly 52% of obese women showing FSD. Significant weight reduction achieved through bariatric procedure implied a reduction of sexual dysfunction in women.

PO2.058

Proteomic and metabolomic manifestations of the different variants of apolipoprotein e genes polymorphism in obese patients

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Introduction: Currently the questions on the role of genes polymorphism that regulate metabolism and implicated in metabolic disorders are disputed.

Objective: The study of proteomic and metabolomic manifestations of the different variants of apolipoprotein E genes polymorphism in obese patients.

Materials/Methods: The study involved 217 obese patients. All the patients underwent genotyping of polymorphic sites c.388 (T>C) c.526 (C>T) of the ApoE gene. Proteomic studies included determination of the adipokines contents (adiponectin, resistin, apelin and visfatin), cytokines (IL-6, TNF α , IL-1 α), CRP and fatty acids L-FABP, annexin V. Assessment metabolomic markers was based on a study of the lipid profile. The

Results: The most pronounced changes in lipid metabolism are revealed in carriers of C allele at position c.388 and T at position c.526 of ApoE gene (c.388 T / C + c.526 C / T and c.388 T / C + c.526 T / T). In conducting of correlation analysis of metabolomic and proteomic markers we found that 1SNP or absence of SNP (c.388 T / T + c.526 C / T or c.388 T / C + c.526 C / C) in ApoE gene is accompanied with dyslipidemia and initiation of inflammation. At 2 SNP in the ApoE gene (c.388 T / T + c.526 T / T and c.388 T / C + c.526 C / T), we have identified correlations of lipid metabolism markers and adipokines (adiponectin, visfatin). At 3 SNP we found the relationship between adipokines (apelin, visfatin, resistin) and pro-inflammatory cytokines (IL-1 α), annexin V and lipid metabolism markers.

Conclusion: The studied polymorphic genotypes may be used in complex with the individual characteristics of energy metabolism, hormonal and immune status of the patient for preventive medical measures and implement a personalized diet of obese patients.

PO2.059

Overexpression of Acyl-CoA Synthetase Long-Chain 5 Protein Isoforms and Effect on Skeletal Muscle Fat Oxidation

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Acyl-CoA Synthetase Long Chain 5 (ACSL5) is a lipid metabolism related protein that plays a role in the esterification of intracellular free fatty acids into fatty acyl-coA molecules. One single nucleotide polymorphism (SNP) of the ACSL5 gene (rs2419621) has been shown to be associated with response to lifestyle modifications. Individuals suffering from overweight and obesity carrying the [T] rare allele are more responsive than [C] allele carriers. Human ACSL5 produces both a long and short protein isoform as a result of alternative splicing. Studies conducted in our lab have illustrated a predominant localization of short and long isoform to the mitochondria and endoplasmic reticulum respectively. We hypothesize that the rs2419621 polymorphism increases ACSL5 short protein isoform localization to the mitochondria increasing fat oxidation thus making rs2419621 [T] rare allele individuals more responsive to the lifestyle interventions. The effect of overexpressing ACSL5 long and short protein

isoforms on skeletal muscle fat oxidation was determined by studying the uptake of 14C-palmitic acid into C2C12 myoblasts following transfection with pCAGIG vectors containing the cDNA of ACSL5 short or long protein. Both complete and incomplete fat oxidation was determined by measuring levels of 14C labelled carbon dioxide and 14C labelled acid soluble products (ASP) respectively. Following adjustment with empty vector levels to determine additional fat oxidation levels from protein overexpression, C2C12 myoblasts transfected with the short isoform showed a significantly greater increase in CO₂ levels (0.043 nmol/hr/mg \pm SEM 0.013) vs long isoform (0.010 nmol/hr/mg \pm SEM 0.005) and significantly greater increase in ASP in culture medium (0.075 nmol/hr/mg \pm SEM 0.023) vs long isoform (0.012 nmol/hr/mg \pm SEM 0.008). Overall, total fat oxidation was significantly increased with ACSL5 short protein isoform overexpression vs long isoform. Future work includes studying human muscle cells from obese female patients carrying the rs2419621 polymorphism and determining the effect of rs2419621 C/T regulated ACSL5 isoform expression on fatty acid metabolism. Authors have no conflict of interest/ nothing to disclose.

PO2.060

IARC Handbook of Cancer Prevention Vol. 16: Weight control

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The first step in cancer prevention is to identify the causes of human cancer and evaluate the effectiveness of prevention strategies. In 1995, the *IARC Handbooks of Cancer Prevention* were launched to complement the *IARC Monographs* by providing evaluations of approaches to cancer prevention. Obesity has been identified as one of the leading risk factor for death and chronic diseases, including cancer. The mean body mass index (BMI) has increased dramatically worldwide over the last decades, and an estimated 3.6% of all new cancer cases in adults in 2012 are attributable to high BMI (>25kg/m²). Although most cases occur in high-income countries, the number is expected to rise globally along with economic development. In 2002, IARC evaluated the cancer-preventive effect of weight control and concluded that there is *sufficient evidence* in humans for a cancer-preventive effect of avoidance of weight gain for cancers of the colon, breast (postmenopausal), endometrium, kidney and esophagus. Evidence for a preventive effect of intentional weight loss was inadequate for any cancer site. Significantly more data are now available and these evaluations need to be revisited: recent studies suggest that obesity increases cancer risk at additional sites, including pancreas and ovary, and reduction in all-cancer and site-specific-cancer incidences following intentional weight loss. Further, recent studies will allow an evaluation of the effect of BMI on survival and cancer recurrence in cancer survivors, and of possible associations between childhood obesity and cancer in adulthood. The mechanisms through which weight control might prevent the increased risk of cancer are only partially understood. Chronic positive energy balance, as well as obesity-associated metabolic alterations, accompanied by increased levels of inflammation, insulin, oestrogens and other hormonal factors, have all been implicated in the incidence of different types of cancer. IARC will reevaluate the cancer-preventive effect of the various aspects of weight control at an IARC Handbook meeting in April 2016. The outcome of the meeting will be presented at the conference.

Laparoscopic Sleeve Gastrectomy in obese patients-middle term follow-up of Vitamin D deficiency

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Background: Morbid obesity is associated with vitamin D deficiency with numerous implications on phospho-calcic metabolism, bone density and more. Bariatric surgery is a modern and efficient treatment for extreme obesity and its indication continues to rise, but clinicians must be aware of pre-existing nutritional deficiencies that need correction and monitoring after surgery.

Aim: Little is still known about the nutritional effects of the novel restrictive bariatric procedure, sleeve gastrectomy on vitamin D deficiency and our study aims to evaluate this particular aspect.

Methods: Our retrospective study was conducted in our department between June 2012 and June 2014. The study group included 42 morbidly obese patients undergoing laparoscopic sleeve gastrectomy, with a mean age of 39.1 years (range between 22 and 63) and mean BMI: 43.5 kg/m² (range between 35 and 61 kg/m²).

Results: At baseline, the average plasma concentrations of 25-hydroxy vitamin D (25OHD) was 18.03 ng/ml. Vitamin D insufficiency (<30 ng/mL) was found in 15/19 patients (79%) and vitamin D deficiency (<20 ng/mL) was present in 13/19 patients (68.4%). Vitamin D supplementation started after the surgical procedure. At 3 months post-surgery follow-up, the mean plasma concentrations of 25OHD was 23.04 ng/ml (increased by 27.7%). Vitamin D insufficiency (<30ng/ml) was found in 14/19 patients (73.6%) and vitamin D deficiency (<20ng/ml) was objectified only in 5/19 patients (26%). At 6 months follow-up, 13 patients were assessed and mean plasma concentrations of 25OHD was stable: 24 ng/ml. The prevalence of vitamin D insufficiency (<30 ng/ml) was persistent in 8/13 patients (61.5%).

Conclusions: Vitamin D deficiency is a common issue in obese bariatric patients, studies reported rates between 40% and 93% and our study confirms this high incidence (79%) and the significant improvement with supplementation after bariatric surgery.

Discussion: The persistence of vitamin D insufficiency at the 6 months follow-up suggests the need for long term vitamin D supplementation after sleeve gastrectomy. The significant improvement of the 25OHD levels with supplementation after bariatric surgery, (↑ 40,2% of mean Vitamin D level) proves the metabolic advantage for the longitudinal sleeve gastrectomy as compared to the malabsorptive techniques of bariatric surgery.

Effects of bariatric surgery on inspiratory muscle strength

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Background: The respiratory function is affected by obesity due to an increased deposition of fat on the chest wall.

Objectives: The objective of this study was to investigate the strength of the inspiratory respiratory muscles of obese individuals and the possible influence of bariatric surgery.

Materials & Methods: Of the patients referred to our bariatric centre between the 3rd of October 2011 and the 3rd of May 2012 the Maximum

Inspiratory Pressure (MIP) was measured at screening and 3, 6 and 9 months postoperative.

Results: The mean age of the 124 included patients was 42.9 ± 11.0 years and mean BMI was 43.1 ± 5.2 kg/m². The mean predicted MIP preoperatively was 127 ± 31 in cm H₂O and the mean measured MIP was 102 ± 24 in cm H₂O. Three patients (2.4%) received training. Three months after surgery the MIP was 76 ± 26 cm H₂O, after 6 months 82 ± 28 cm H₂O and after 9 months 86 ± 28 cm H₂O. All postoperative measurements were significant lower than preoperatively (P < 0.05). No significant difference was found between patients who had a sleeve gastrectomy compared to a gastric bypass (P = 0.06, P = 0.165 and P = 0.124 after 3, 6 and 9 months respectively). The only influencing factor for the preoperative MIP was age (p = 0.014).

Conclusion: The preoperative MIP values were significantly lower than the predicted MIP values and a significant decrease in inspiratory pressures was found at 3, 6 and 9 months after bariatric surgery.

Palatable high-fat diet provokes higher fat accumulation than standard high-fat diet in the rat

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Background/Aims: In rats, high-fat diets induce an increase of body fat content irrespective on the form the fat is provided (chow pellets or self-selected palatable food). We intended to determine whether fatty acid composition and type of diet affect rat's growth pattern.

Methods: Male Wistar rats (10 week-old) were fed 30 days with a simplified cafeteria diet (KD) or standard diet supplemented with coconut oil (CD). Fat derived energy was 40% (KD) and 37% (CD); saturated fatty acids were 53% (KD) or 77% (CD) and monounsaturated were 35% (KD) and 10% (CD). Energy from proteins was 13% (KD) and 14% (CD). Food intake and weight changes were recorded. The animals were sacrificed with excess isoflurane anaesthesia and samples of blood and tissues were obtained. The bodies were ground and used for whole body composition analysis. Energy and nutrient balances were established using an undisturbed control group.

Results: KD rats had a higher energy, protein and lipid intake than CD. Consequently KD weight increased 15% more than CD. KD animals had also a high proportion of adipose tissue (retroperitoneal + mesenteric + epididymal): 6.3% of body weight (KD) vs. 4.5% (CD). Protein and lipid balances were higher in KD, in spite of their higher energy cost of accrual. CD rats had lower plasma cholesterol but higher urea values.

Discussion and Conclusions: Varied and self-selectable palatable diets, provide and additional reward stimulus which affect (increasing) the control of energy intake (KD). The effects of fat supplementation of the standard diet (CD) only lowers food intake to maintain the energy balance, lowering the relative intake of protein. Dietary palatability (largely associated to its fat content), thus, overcomes the innate control of energy intake, resulting in excess food intake, occasioning an increased lipid deposition.

Safety, feasibility and short term complication following LSAGB(laparoscopic single anastomosis Gastric Bypass), results in the first 277 cases

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Background: In the past 10 years, laparoscopic single anastomosis Gastric Bypass (LSAGB) procedure has been gaining popularity among bariatric surgeons who showed excellent short and long term results. The combination of restriction and some degree of malabsorption seems to improve the long term results in addition to the marked improvement in comorbidities. Database from the first 277 patient was retrospectively studied including telephon calls.

Results: Mean age was 41.84 ± 12.46 years (range, 13–72), preoperative BMI was 42.17 ± 6.47 kg/m² (range, 21.63–78.91), mean preoperative weight was 117.33 ± 22.9 kg (range, 54–235), 174 (62%) were females and 104 (38%) males. Length of stay for primary vs. revisional MGB was 2.28 ± 1.11 days vs. 2.43 ± 1.35 days. 7 patients (2.5%) were reoperated within 7 days of surgery, 2 patients (0.7%) due to stapler line bleeding, 2 patients (0.7%) due to stapler line leakage, 3 patients (1%) due to anastomotic obstruction. Most of these reoperations were during the learning curve. No mortality or severe morbidity.

Results: LASGB is feasible and safe even in revisional surgery, most complications occurred during the learning curve.

PO2.065

Genomic, proteomic and metabolomic predictors of nonalcoholic fatty liver disease in obese patients

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Background: The prevention, diagnosis and treatment of diseases associated to obesity require a qualitative increase of efficiency. There are still disputable questions about diagnostic significance of some molecules, including genomic, proteomic and metabolomic biomarkers.

Methods: We observed 72 obese patients (20 men and 52 women, mean age - 41.3 ± 2.5) and performed ultrasound elastography and ultrasound of liver. We have identified two groups of patients: Group 1 consisted of 50 obese patients without complications (BMI - 43.2 ± 0.6), group 2 consisted of 22 patients with obesity complicated with nonalcoholic fatty liver disease (BMI - 45.8 ± 2.3). Determination of the adipokines (adiponectin, ghrelin, resistin, visfatin, and apelin), cytokine (interleukin-6, TNF α) oxidized lipoproteins (oxLDL), adhesion molecule sICAM (soluble intercellular cell adhesion molecule), fatty acid transporter L-FABP in serum was performed by ELISA. Study of the lipid metabolism involved determination of total cholesterol, triglycerides, low and high density lipoproteins (LDL and HDL) concentrations by turbidimetry and spectrophotometry by analyzer.

Results: In addition, we conducted analysis of polymorphic alleles $\epsilon 2$, $\epsilon 3$, $\epsilon 4$ of ApoE gene using polymerase chain reaction. Our data indicate that reducing the concentration of adiponectin ($0.46 - 1.71$ mcg / ml), increasing the level of glucose ($5.57 - 6.25$ mmol/l), triglycerides ($2.06 - 3.94$ mmol/l), TNF α ($5.07 - 16.68$ pg/ml) and L-FABP ($11.62 - 23.76$ pg/ml) are predictors of nonalcoholic fatty liver disease in obese patients, and the presence of genotype $\epsilon 3/\epsilon 4$ of ApoE gene is a poor prognostic marker of severity of nonalcoholic fatty liver disease.

Conclusion: The data allow considering the increasing of the concentration of L-FABP and TNF as predictors of NAFLD in obese patients, and genotype $\epsilon 3 / \epsilon 4$ of the ApoE gene – as an adverse prognostic marker of the severity of NAFLD.

PO2.066

Effect of BMI, omega-3 and age on lipoprotein patterns with implications for cardiovascular health

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Background and Aims: Serum lipoprotein patterns are crucial for cardiovascular health and influenced by many factors, such as age, gender, diet, obesity, physical activity and genetics. This work aimed at quantifying the impact of non-genetic factors on lipoprotein features. Influence of obesity, dietary intake of marine omega-3 fatty acids and age was assessed for women with normal weight, overweight and severe obesity. BMI was used as a measure of obesity and the ratio EPA/AA, i.e. the omega-3 fatty acid eicosapentaenoic acid (EPA) to arachidonic acid (AA), was used as an indicator of fraction of marine omega-3 in the diet. This ratio is generally accepted as a marker of cardiovascular health.

Material and Methods: 45 women with normal weight and overweight (BMI ≤ 30) and 27 with severe obesity (BMI ≥ 35) of age 18–60 years were recruited from the Norwegian Fjord region. Exclusion criteria were serious diseases, use of lipid-lowering drugs, pregnancy, smoking and alcohol abuse. Serum samples after overnight fast were analyzed by chromatography to obtain lipoprotein subclass profiles and fatty acid profiles. Multivariate discriminant and regression analysis were used to establish predictive models between lipoprotein features and BMI, EPA/AA and age.

Results: Age showed no correlations to high density lipoprotein (HDL) features, but strong positive correlations to total cholesterol, Apolipoprotein B and concentrations of all low density lipoprotein (LDL) subclasses. Apolipoprotein A1 and concentration and average size of HDL particles correlated strongly positively to EPA/AA and negatively to BMI. Average size of very low density lipoprotein (VLDL) particles showed a strong positive correlation to BMI and a negative correlation to EPA/AA.

Conclusion: Despite the many factors that influence lipoprotein pattern, models based on only BMI, EPA/AA and age explained 38–64% of the variability in lipoprotein features that are crucial to cardiovascular health: Total concentration of VLDL and HDL, the subclasses of large and medium HDL particles, the subclass of large VLDL particles and average size of HDL and VLDL particles. BMI was negatively correlated to all the HDL features and positively correlated to all the VLDL features.

Reference:

Lin C, Rajalahti T, Mjøs SA and Kvalheim OM, Metabolomics 2016, 12:6.

PO2.067

Association of fasting insulin resistance and postprandial triglyceridemia in normoglycemic morbid obese subjects

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Aim: To study the association of fasting insulin resistance and postprandial triglyceridemia (TG) after an oral fat load test (OFLT) in normoglycemic morbid obese (MO) subjects.

Material/Methods: We initially selected 45 MO subjects. 23 of them presented normoglycemia (fasting glucose < 100 mg/dL). In all subjects at fasting and every 2 hours (8 hours, end point) after an OFLT with unsaturated fat (125 ml of SupracalR), we measured glucose, insulin, fasting HOMA index and plasma lipids with standard methods. According to fasting HOMA index > 50 percentile of the whole group, 16 showed $< p50$ (Group A: no “insulin resistance”).

Results: HOMA indexes were (mean \pm SD): Group A: 3.14 ± 0.84 and Group B 7.12 ± 1.63 . We found no significant differences in age, gender distribution, BMI, waist circumference, fasting cholesterol and plasma glucose values comparing both groups. Group B showed significantly higher values of fasting TG (A: 104.38 ± 26.96 vs B: 147.57 ± 59.95 mg/dL; $p = 0.024$), TG 2 hours after OFLT (A: 106.94 ± 25.92 vs B: 149.29 ± 59.01 mg/dL; $p = 0.015$) and TG 4 hours after OFLT (A: 118.94 ± 30.75 vs B: 176.71 ± 76.29 mg/dL; $p = 0.01$). We found a significant association of fasting TG values and fasting HOMA index ($r 0.695$ $p = 0.001$) and TG 4 hours after OFLT (maximal response) and fasting HOMA index ($r 0.686$ $p = 0.01$), no significant correlation was found with BMI, waist circumference nor fasting plasma glucose levels.

Conclusion: In normoglycemic morbid obese subjects the grade of insulin resistance but not adiposity is associated with postprandial TG response.

PO2.068

Genomic, proteomic and metabolomic predictors of atherosclerosis in obese patients

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Background: Currently there is no extensive research of metabolic disorders in obese patients and atherosclerosis, including the study of genomic, biochemical, immune and other markers. Therefore, the aim of the study was to identify the genomic, proteomic and metabolomic predictors of atherosclerosis in obese patients.

Methods: Was evaluated condition of the cardiovascular system 123 obese patients aged 18 to 66 years, on the basis of which were divided in two groups of patients: Group 1 consisted of 50 obese patients without vascular pathology, 2nd group consisted of 73 patients with obesity, complicated by atherosclerosis. Also conducted a study of the state of lipid metabolism and analysis of polymorphic alleles $\epsilon 2$, $\epsilon 3$, $\epsilon 4$ ApoE gene was performed by PCR.

Results: The obtained data revealed clinically significant predictors of atherosclerosis in obese patients: homozygous genotype $\epsilon 2 / \epsilon 2$ of ApoE gene, an increase in triglycerides, oxidized low-density lipoprotein, interleukin-6, adhesion molecules sICAM, protein transporter of fatty acids L-FABP and reducing adiponectin.

Conclusion: Our findings substantiate the benefits of using the results of genomic, proteomic and metabolomic studies in obese patients as a prognostic marker for cardiovascular disease.

PO2.070

Nitric oxide production could predict visceral adiposity dysfunction in adults: A prospective approach in Tehran Lipid and Glucose Study

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Background and Aim: The association of nitric oxide (NO) production and obesity-related states is currently a challenging issue. This study was conducted to investigate whether serum nitric oxide metabolites (NOx), an indicator of systemic NO synthesis, could predict visceral adiposity dysfunction (VAD), a novel biomarker of visceral adipose tissue related to risk of diabetes and cardiovascular disease.

Methods: 2243 adult men and women participated in the Tehran Lipid and Glucose Study were required. Serum NOx concentrations were measured at baseline (2006–2008); anthropometrics, and biochemical measures were evaluated during a median of 6.3 years follow-up, in the three intervals. Visceral Adiposity Index (VAI), an indicator of adipose distribution and function, was calculated using sex-specific formulas: males [waist circumference/39.68 + (1.88 × body mass index)] × (triglycerides/1.03) × (1.31/HDL-C), Females: [waist circumference/36.58 + (1.89 × body mass index)] × (triglycerides/0.81) × (1.52/HDL-C). The association of serum NOx concentrations with the occurrence of VAI changes and the incidence of VAD were evaluated.

Results: Mean age of participants was 41.5 ± 14.5 years at baseline and 39.4% were male. Mean baseline VAI values were 3.2 ± 3.1, 3.5 ± 2.9, and 4.1 ± 3.9, in the first, second and third tertiles of serum NOx, and higher

serum NOx concentrations were accompanied with higher VAI values at the follow-up examinations ($\beta=0.41$ and 0.36 , $P < 0.001$). After adjustment of confounding variables, the occurrence of VAD in the highest compared to the lowest tertile of serum NOx (≥ 30.9 vs. < 19.9 $\mu\text{mol/L}$), increased by 43% (OR= 1.43, 95% CI= 1.11–2.14, P for trend= 0.033).

Conclusion: Elevated serum NOx levels may be an independent predictor of visceral fat accumulation, adipocyte dysfunction and related metabolic disorders.

PO2.071

Adiponectin in different clinical and morphological stages of non-alcoholic fatty liver disease in patients with abdominal obesity and the effect of metformin on its level

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Introduction: Non-alcoholic fatty liver disease (NAFLD) is a disease associated with abdominal obesity, metabolic syndrome and increases the risk of cardiovascular disease and type 2 diabetes. Low level of adiponectin is an independent risk factor for the development and progression of NAFLD.

Objective: Examine the level of adiponectin in patients with abdominal obesity in different clinical-morphological forms of NAFLD and the effect of metformin on its level.

Methods: 77 patients aged 30–50 years with abdominal obesity and NAFLD according to the liver biopsy (NAFLD activity score) are examined. The examination included: anthropometric parameters, the study of carbohydrate, lipid profile and adiponectin levels in the blood serum. Patients were divided into two groups: non-pharmacological treatment and primary with metformin 2000 mg per day for 12 months.

Results: Non-alcoholic steatohepatitis (NASH) was diagnosed in 64 patients, steatosis - 11, cirrhosis - 2. Low level of adiponectin detected in 88.3% ($n = 68$) patients with NAFLD: 89.1% with NASH and 45.5% - steatosis. The level of adiponectin examined with NAFLD was 6.1 [4.5; 9.1] mcg/ml. The level of adiponectin decreased with the progression of NAFLD: in the steatosis was 10.1 [7.4; 10.9] mcg/ml, NASH - 5.7 [4.3; 8.3] mcg/ml, cirrhosis - 5.4 [5.3; 5.5] mcg/ml. There were significant correlations of adiponectin levels with index HOMA-IR ($r = -0.45$; $p = 0.023$), insulin ($r = -0.35$; $p = 0.024$), HDL cholesterol ($r = 0.45$; $p = 0.007$) and level of inflammation in the liver ($r = -0.56$; $p = 0.007$). There were no correlation of adiponectin with the severity of fibrosis and steatosis. After 12 months in the group with metformin noted a significant reduction of adiponectin of 3.0 mcg/ml (46.9%; $p < 0.0001$). In the control group significant changes in adiponectin level was not detected ($p > 0.05$). Increasing the concentration of adiponectin was independent of weight loss, BMI and waist circumference reduction and parameters of carbohydrate metabolism.

Conclusion: NAFLD in patients with abdominal obesity are associated with low levels of adiponectin, decreasing the progression of inflammation in the liver. Combined therapy with metformin in patients with abdominal obesity contributes to a significant increase in adiponectin levels, which can affect the cardiometabolic risk reduction.

PO2.072

Effect of recruitment maneuver on respiration mechanics in laparoscopic sleeve gastrectomy operations

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Background and Aim: Obesity and anesthesia, separately from each other, constitute a tendency for atelectasis and decrease in functional residual capacity. The aim of our study is to investigate the effect of “recruitment” maneuver on respiratory mechanics and arterial blood gases in LSG operation applied in morbid obese patients.

Material/Method: A total of 60 (ASA) II-III patients with a body mass index between 40–55 and scheduled for elective LSG were included in our study. Patients were separated into two groups. Mechanical ventilation of 6 mL.kg⁻¹ tidal volume in accordance with adjusted body weight, 8 cm-H₂O positive end-expiratory pressure (PEEP) was applied to all patients. Manual “recruitment” maneuver was applied 5 minutes after desufflation to the patients in recruitment group (n = 30) under 100% oxygen with 40 cmH₂O pressure for 40 seconds. Respiratory mechanics (compliance and airway pressures) and arterial blood gas evaluations of both groups were made in the 10th minute after induction, 10th minute after insufflation, 5th minute after desufflation and 15th minute after desufflation. Also, arterial blood gas evaluation was made in recovery room 30th minute after operation.

Results: In our study, it was demonstrated that oxygenation increased significantly in the recruitment group after recruitment. In 30th minute values after operation; partial arterial oxygen pressure (PaO₂) values were found significantly high and partial arterial carbon dioxide pressure (PaCO₂) values were found significantly low in the recruitment group compared to the control group. In the 15th minute measurements after desufflation, compliance was detected higher in the recruitment group. In the perop and postop periods there was not any change in the hemodynamic state of the patients associated with recruitment maneuver and there was no any unexpected effect or complication.

Conclusion: Application of “recruitment” maneuver in addition to PEEP application may be safely used as a more effective method to improve respiratory mechanics and the arterial blood gases in morbid obese patients who had LSG operation.

PO2.073

The evaluation of serum lipid profile after a weight loss program: A Pilot Study

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Aim: In recent years, the increasing prevalence of obesity has increased the risk of cardiovascular disease. In particular, increasing in abdominal adiposity and dyslipidemia contribute to raising this risk. Nowadays, healthy weight loss program by controlling of dietitians and physicians become important. It was aimed to observe the differences in serum lipid profile after 3 months-weight loss program which was conducted by a dietitian.

Materials/Method: In this present study, 35 female subjects, aged between 20–43 years with BMI were >30 kg/m² were randomly selected. The weight loss programs after the evaluation of age, height, weight, body mass index (BMI), lifestyle factors of the individuals were planned by a dietitian. The serum lipid profile of the individuals was determined before and 3 months-after the weight loss program.

Results: The decrease in body weight (kg), BMI (kg/m²), fat (%), total body of water (kg), waist circumference [(cm), waist/hip ratio (mm)] was statistically significant after 3 months-weight loss program (p<0.00). The lipid profiles (total cholesterol (TC), low density lipoprotein-cholesterol (LDL-C) and high density lipoprotein-cholesterol (HDL-C) levels) were significantly decreased after the study (p<0.00).

Conclusion: At the end of the study, it was observed an improvement in the anthropometric and serum lipid profiles with implemented individual specific-weight loss programs.

Table 1. The assessment of lipid profiles of females before and after 3 months-weight loss program

BMI: Body mass index, FM: Fat mass, TBW: Total body water, TC: Total cholesterol, LDL-C: Low density lipoprotein-cholesterol, VLDL-C: Very low density lipoprotein-cholesterol, HDL: High density lipoprotein-cholesterol, TG: Triglyceride

	At the beginning	After 3 months	
Anthropometric measurements	Mean±SD	Mean±SD	p
BMI(kg/m ²)	31.1 ± 2.75	28.7 ± 2.56	<0.00*
FM (%)	38.8 ± 3.71	34.9 ± 4.26	<0.00*
FM (kg)	30.8 ± 6.03	25.8 ± 5.99	<0.00*
TBW (kg)	35.1 ± 2.78	34.2 ± 2.54	<0.00*
Biochemical parameters			
FPG (mg/dL)	87.7 ± 10.65	86.1 ± 9.10	0.22
TC (mg/dL)	182.371 ± 34.41	164.0 ± 29.77	<0.00*
LDL-C (mg/dL)	108.7 ± 31.59	94.0 ± 31.70	<0.00*
VLDL-C (mg/dL)	18.7 ± 9.06	17.0 ± 6.71	0.19
HDL-C (mg/dL)	53.7 ± 14.45	50.2 ± 11.33	<0.00*
TG (mg/dL)	91.3 ± 42.40	82.5 ± 28.06	0.14

PO2.074

Comparative analysis of respiratory muscle strength before and after bariatric surgery using five predictive equations

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Background & Aims: Obesity is the most common chronic metabolic disease worldwide, with detrimental effects on respiratory function. Less is known about the recommended reference values for respiratory muscle strength in the morbidly obese population.

Objectives: This study aimed to evaluate respiratory muscle strength in the morbidly obese population, before and after bariatric surgery, and to compare these estimates with the predictive values using different mathematical equations available

Materials & Methods: A multidisciplinary team screened patients referred to a bariatric centre preoperatively. Their Maximum Inspiratory Pressure (MIP) was measured at screening and 3, 6 and 9 months postoperative. Predictive values were calculated using five different mathematical equations. Visual inspection of Bland-Altman plots was performed to determine the agreement between the equations studied.

Results: In total 122 patients were included in this study, among them were 104 females and 18 men, with a mean age was 43.02 ± 11.11 years and mean BMI was 43.10 ± 5.25 kg/m². There were no significant differences between the predicted MIP (according to Neder, Harik-Khan, Enright, Costa and Wilson equations) and the actual obtained MIP preoperatively (p > 0.05). Also there were no significant between the predictive values and the postoperative MIP values. (P > 0.05) Bland Altman analysis showed that the Enright equation was best suitable for predicting the MIP. **Conclusion:** Of the five mathematical equations studied, that of Enright and colleagues was found best suitable for predicting the MIP in the obese population studied.

PO2.075

Evaluation of antropometric measurements and blood lipids of individuals who were applied diet with physical activity

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Aim: The aim of this study was to determine the effects of weight loss to body composition and some biochemical parameters in adult obese women.

Materials/Method: This was a prospective cohort study, conducted on adult women aged between 20–45 years, living in Ankara. The participants were divided into two groups according to their body mass index (BMI) >27 kg/m². While the first group has performed diet therapy alone, the second group has performed both diet therapy and physical activity. Both of the groups were performed diet and behavioral therapy in the period of 12 weeks.

Results: At the end of the study, the weight loss of the participants in the diet alone and diet+physical activity group have found 75.3 ± 1.77 kg (BMI: 30.4 ± 0.50 kg/m²) to 70.7 ± 1.90 kg (BMI: 28.5 ± 0.53 kg/m²); and 82.5 ± 2.02 kg (BMI: 31.8 ± 0.75 kg/m²) to 73.9 ± 2.16 kg (BMI: 28.4 ± 0.70 kg/m²) respectively (p = 0.000). It has found statistically significant reductions on serum total cholesterol (TC) (p = 0.000), low-density lipoprotein cholesterol (LDL-C) (p = 0.001), very low-density lipoprotein cholesterol (VLDL-C) (p = 0.040), triglycerides (TG) (p = 0.036), systolic blood pressure (SBP) (p = 0.040), diastolic blood pressure (DBP) (p = 0.043) of the diet+physical activity group, and there was a significant reduction on the TC (p = 0.033) of the diet alone group.

Conclusion: As a result of this study, the diet and physical activity together have positive effects on weight loss, biochemical parameters and energy expenditure.

PO2.076

Does intestinal microbiota affect body weight?

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Obesity is major health problem which prevalence has been increased rapidly. The studies show that the risk of death rises with increasing weight. In addition overweight and obesity play a crucial role for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Obesity has affected by many risk factors (genetic, environmental, cultural, and sociodemographic factors etc.). It was known that obesity result from energy unbalanced and/or sedentary life style. However in recent studies has focused on the effect of microbiota on obesity. Many studies showed that microbiota changes in the gut microbiota are linked with metabolic disorders such as obesity. The gut microbiota is a complex of microorganisms including more than 100 trillion cells of 400 species. Additionally recent research demonstrated that microorganism' species or amount may change with increasing body weight and eating habits. Mostly recent studies focused on the effect of microorganism' species, inflammation, energy balance, short-chain fatty acids. Many studies showed that while Firmicutes increase in obese individuals, Bacteroides decrease in obese individuals. Besides the increase in acteroidetes was correlated to weight loss in obese individuals. Bifidobacteria have beneficial effects on the host energy metabolism and inflammatory responses. It was stated that a high-fat diet is related with a reduction in bifidobacteria and increasing in gut permeability. Furthermore lipopolysaccharide (LPS) plasma levels, leading to inflammation, may be affected by obesity and high fat diet. Although there are a lot of mechanism about microbiota and obesity, the mechanisms are unclear. The prevention of rapid increase in the prevalence of overweight and obesity is important for health. Treatment of obesity are contributing to both prevention of the risk of obesity and chronic disease. It was thought that microbiota – a new approach-will have gained increasing interest for the treatment of obesity. The assessment of microbiota is for prevention and treatment of obesity may have a major as well as diet. It was needed long term, case control studies more in the future.

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PO2.077

Long-term unemployment is related to impaired glucose metabolism in middle-aged men: A follow-up of the Northern Finland Birth Cohort 1966

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Aims: Stressors related to working life have been suggested to predispose to type 2 diabetes, typically occurring in the working age. However, unemployment, a common stressor, has been scarcely studied in relation to the development of type 2 diabetes. We explored whether varying lengths of unemployment are associated with impaired glucose metabolism in the general population.

Methods: As a part of the 46-year follow-up study of the Northern Finland Birth Cohort 1966, we analyzed the oral glucose tolerance tests (OGTT) of 1970 men and 2544 women in relation to their individual three-year employment histories collected from national registers and classified into three categories: employed, short-term (≤ 1-year) and long-term (> 1-year) unemployed.

Results: Among men, pre-diabetes was found in 19.2% of employed, 23.0% of short-term unemployed and 27.0% of long-term unemployed individuals, and the corresponding figures for screen-detected type 2 diabetes were 3.8%, 3.8% and 9.2%, respectively (p < 0.01). Among women, the corresponding figures for pre-diabetes were 10.0%, 12.6% and 16.2% and for screen-detected type 2 diabetes 1.7%, 3.4% and 3.6%, respectively (p < 0.01). Among long-term unemployed men, 4.1% of the risk of pre-diabetes could be attributed to unemployment, and the corresponding figure for women was 6.0%. In addition, among long-term unemployed men, 13.1% of the risk of screen-detected type 2 diabetes was attributable to unemployment, and the corresponding attributable risk was 10.3% for the long-term unemployed women. Long-term unemployed men had a higher risk for pre-diabetes (OR 1.59, CI 95% 1.01–2.50) and screen-detected type 2 diabetes (OR 2.38, CI 95% 1.08–5.27) than employed men, after adjustment for education, smoking, alcohol intake, physical activity and body mass index (BMI). In women, corresponding associations disappeared after adjustment for lifestyle factors and BMI.

Conclusion: Long-term unemployment may be a risk for type 2 diabetes in middle-aged men. The readily available anamnestic information on recent unemployment might be helpful for the clinicians in recognizing high risk and considering screening for diabetes in middle-aged individuals. Conflict of interest: None

PO2.078

Inequalities in morbid obesity in England: Cross-sectional analysis of nationally representative data

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Background & Aims: Morbid obesity (BMI ≥40kg/m²) is increasing rapidly in prevalence. Few studies have investigated the social epidemiology of morbid obesity. This study aimed to describe the distribution and determinants of morbid obesity in England.

Methods: We included data from the Health Survey for England 2011 to 2013. Participants aged ≥20 years with valid BMI measurements were included. Age-standardised prevalence of morbid obesity was estimated by gender, region, ethnicity and socioeconomic status (SES). SES measures included Index of Multiple Deprivation (IMD), education, income and National Statistics Socio-economic classification (NS-SEC). Multivariable

logistic regression and Slope Indices of Inequality (SII) were used to evaluate the relationship between morbid obesity and SES.

Results: There were 20,282 adults (55% women) including 570 (158 men and 412 women) with morbid obesity. The prevalence of morbid obesity was greatest in women aged 35 to 54 (4.2%) and in men aged 55 to 64 (2.4%). Ethnic differences were observed, with the lowest rate of morbid obesity being in 'black' men (0%) and the greatest rate of morbid obesity in 'black' women (5.39%, 95% CI 3.07 to 7.71). Morbid obesity was least frequent in London and most frequent in Northern England. SES was strongly associated with morbid obesity in both genders, but the effect was greater in women than men. The SII showed that compared with the least deprived, the most deprived men had relative odds of morbid obesity of 2.64 (95% confidence interval 1.49 to 4.67); for women the relative odds were 3.29 (2.30 to 4.72). Lower values for SII were noted for severe and simple obesity.

Conclusions There are major disparities in the distribution of morbid obesity, which are greater than are observed for all obesity. Women from deprived communities are most affected and there are also regional and ethnic variations. These findings have important implications for healthy life expectancy and highlight the need for better interventions for prevention and management.

PO2.079

Impact of migration status on BMI, nutrition-related knowledge and dietary pattern in Viennese schoolchildren

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Background & Aims: The childhood obesity prevalence has risen in Europe [1]. Obesity in childhood causes serious complications, and raising public-health concerns [1].

Objectives: The purpose of this analysis was to determine how the migration status of Viennese schoolchildren affect the BMI, the nutrition-related knowledge and the dietary patterns.

Material & Methods: This cross-sectional study was conducted on 617 children aged 10–12 years attending secondary schools in Vienna, Austria. Nutrition-related knowledge (based on 20 questions), and BMI percentiles [2] were assessed. Principal component analysis (PCA) was used to identify the dietary patterns of 19 food groups. It revealed two dietary patterns: junk food and prudent.

Results: 10% of pupils [47% female; BMI 18.7(3.5) kg/m²] were overweight and 5% obese. 64% had migration status and significantly more immigrants were overweight (12%) and obese (6%) compared to Austrians (7% and 4%; $p = 0.013$). There were significant differences between Austrians and Immigrants in BMI [19.1 (3.5) vs. 18.0 (3.3) kg/m², $p < 0.001$] and nutrition-related knowledge score [11.4 (3.8) vs. 12.7 (2.9) points, $p < 0.001$]. 46% of the children demonstrated a junk food and 54% a prudent pattern. There was no significant difference between Austrians and Immigrants regarding dietary patterns (Austrians: 55% prudent vs. 45% junk food pattern; Immigrants: 53% vs. 47%; $p = 0.678$). As break time snack at school, 75% Austrians and 25% Immigrants ate fast food ($p < 0.001$) and 72% vs. 28% consumed no fruits ($p = 0.023$).

Conclusion: Overall, schoolchildren with migration status showed rather unfavorable dietary habits, as they consumed fast food more often and no fruits as break time snack at school. Moreover, they had lower nutritional knowledge, higher BMI and were more likely overweight.

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PO2.080

Obesity and socio-economic factors among the Moroccan school children (the case of the Wilaya of Marrakesh)

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The results presented in this study come from a cross-sectional survey of growth, food and hygiene behavior conducted in 2010. The sample consists of 1407 schoolchildren with 656 boys aged 12 to 18 years. The assessment of nutritional status is made from the Body Mass Index (BMI) following the curves of CDC. Overall the students surveyed, nearly 77% have BMI values "normal" and 23% have a nutritional problem of underweight, overweight and obesity. The prevalence of these problems is higher among boys than girls respectively 30.2%, and 18.0%. This difference is statistically significant (chi-square = 58.58 and $p < 0.001$). By place of residence, it appears that underweight is more predominant in rural areas (19.8%) than urban areas (12.1%) however, the percentage of overweight and obesity is important in urban areas (11.4%) than in rural areas (4.5%). The prevalence of underweight was higher among children whose parents have low levels of instructions however overweight and obesity are associated with higher levels of instructions. As for socio-professional categories, overweight and obesity are observed especially in children traders, managers and officials. The results of the study have identified some contributing factors of overweight that are living in urban area, gender and the high socio-economic and cultural level of the parents. Consequently it is important to establish a prevention program that addresses modifiable factors to influence the trend in the prevalence of overweight and obesity and its health consequences in children school. The efforts should focus on health education, on a balanced diet and the importance of regular physical activity.

PO2.081

Can a lifestyle intervention for pregnant women with obesity affect gestational weight gain?

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Background & Aims: Maternal obesity is becoming an increasing global public health issue, and the adverse effects on mother and child are substantial (1). In Sweden, 25% of women have overweight (BMI>25–29.9) and 13% have obesity (BMI ≥30) at the onset of pregnancy (2).

Objectives: To evaluate the Mighty Mums Project (3), a low-intensive lifestyle intervention directed to pregnant women with BMI ≥30, with the primary aim to reduce gestational weight gain to less than 7 kg.

Material & Methods: A controlled intervention study was conducted in 2011–2013 in Gothenburg, Sweden. All study participants ($n = 1165$) received standard antenatal care, and the intervention group ($n = 465$) additionally received support to change to a more healthy life style, including physical activity and healthy eating. A log was used throughout pregnancy to register weight, activity and food. Data was derived from medical records during pregnancy until postnatal check up and from the Swedish birth register.

Results: and Conclusion: Analysis of a pilot group showed significant effect on gestational weight gain in the intervention group (8.6 ± 4.9 kg vs. 12.5 ± 5.1 kg; $p = 0.001$), in which a greater proportion of women man-

aged to restrict their gestational weight gain to less than 7 kg (36% vs. 16%; $p = 0.039$) (3). The result from the full scale study will be presented and discussed at the conference.

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PO2.082

Do making habits or breaking habits influence weight loss and weight loss maintenance? A randomised controlled trial

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Background: Despite the significance placed on lifestyle interventions for obesity management, around 40% of weight loss is regained over the first year following treatment, and much of the rest over the next three years. Two psychological concepts (habitual behaviour and automaticity) have been suggested as the most plausible explanation of this overwhelming lack of long-term weight loss success.

Method: We evaluated the efficacy of two interventions that explore these theories: Ten Top Tips (10TT) and Do Something Different (DSD). 10TT promotes automaticity; this is the ability to perform tasks without awareness or deliberation. Therefore, diet and exercise related behaviours become automatic or habitual. Conversely DSD promotes behavioural flexibility. This program disrupts daily routines by assigning an individual with unstructured tasks to perform. Behavioural flexibility therefore has an inverse relationship with automaticity and is defined as the measure of an individual's range of mindful behaviours. In previous studies, both interventions have achieved significant weight loss with results suggesting potential for maintenance of the weight lost. The research however is limited and long-term (12 month) results are yet to be explored. Men and women ($n = 75$), aged 51 ± 6 (s.d.) years with body mass index 34.5 ± 4.1 kg/m² were randomised to 12-week 10TT, DSD or no treatment control. Active intervention participants underwent 12 weeks of the program with 12-months follow-up.

Results: We collected data for weight, BMI, waist circumference as well as habitual behaviour and wellbeing. After 12 weeks intervention, weight loss averaged 4.6kg in the 10TT group, 4.1kg in the DSD group and 1.3kg in the control group. There was significant improvement in wellbeing in the 10TT and DSD groups. Significance of research: Results: from this RCT have the potential to help in understanding the mechanisms relating to weight loss maintenance.

PO2.083

Technology-based interventions in the treatment of overweight and obesity: A systematic review

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The prevalence of obesity increases worldwide. The use of technology-based interventions can be beneficial in weight loss interventions. This review aims to provide insight in the effectiveness of technology-based interventions on weight loss and quality of life for patients suffering overweight or obesity compared to standard care. Pubmed, PsycInfo, Web of Science, ScienceDirect, CINAHL and Embase were searched from the earliest date (of each database) up to February 2015. Interventions need-

ed to be aimed at reducing or maintaining weight loss in persons with a body mass index (BMI) ≥ 25 kg/m² and have a technology aspect. Cochrane Collaboration's tool for assessing risk of bias was used for rating the methodological quality. Twenty-seven trials met inclusion criteria. Thirteen studies showed significant effects on weight loss compared to controls. Most interventions used a web-based approach (42%). Interventions were screened for five technical key components: self-monitoring, counsellor feedback and communication, group support, use of a structured program and use of an individually tailored program. All interventions that used a combination of all five or four components showed significant decreases in weight compared to controls. No significant results for quality of life were found. Outcomes on program adherence were reported in six studies. No significant results were found between weight loss and program adherence. Evidence is lacking about the optimal use of technology in weight loss interventions. However, when the optimal combination of technological components is found, technology-based interventions may be a valid tool for weight loss. Furthermore, more outcomes on quality of life and information about the effect of technology-based intervention after bariatric surgery are needed.

PO2.084

Maternal wellbeing, sleep and stage of exercise behavior change impacts on maternal anthropometry and body composition in an overweight and obese pregnancy

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Background: An inverse relationship between sleep duration, mood and body mass index (BMI). Lower 'stage of behavior change' scores are associated with negative lifestyle behaviors. Little is known on the effect of these parameters in pregnancy.

Objective We sought to assess the relationship between maternal wellbeing, stage of change, sleep duration and maternal body composition in an overweight and obese pregnant population

Methods: This is a prospective cohort study of 124 women in early pregnancy. Maternal anthropometry was assessed by measuring mid-upper arm circumference (MUAC), BMI and bioelectrical impedance analysis. The following additional data were collected using a lifestyle questionnaire: educational attainment, stage of behaviour change in the trans-theoretical model, sleep duration and wellbeing (WHO-5 Item Wellbeing Index, expressed as a percentage)

Results: A total of 124 women were included in the analysis. The mean BMI was 29.2 kg/m² (± 3.48), and percentage fat mass (%FM) was 35.4% (± 6.7). Patient's mean stage of behavior change was 2.9 (± 1.4), wellbeing percentage score of 54 (± 16) and average sleep duration of 6.8 hours. Maternal wellbeing positively correlated with sleep duration ($p = 0.05$). Maternal stage of behavior change negatively correlated with %FM and positively correlated with %FFM (percentage fat free mass). K-means cluster analysis revealed that as BMI increased from 27 to 29 kg/m², there was a corresponding decrease in total wellbeing score from 60% to 52% and sleep duration from 472 to 322 minutes.

Conclusions These results demonstrate the complex link between psychological behaviors, maternal body composition, and anthropometry and sleep duration in early pregnancy. Strategies to improve psychological wellbeing and sleep patterns could increase maternal levels of motivation and readiness to engage in healthier lifestyle behaviors in pregnancy. This may improve maternal adiposity and body composition with potential beneficial effects on maternal and perinatal outcomes.

The Quality of life in Overweight and Obese Children and Adolescents during a Community-based Obesity Treatment Programme

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Introduction: The quality of life is severely impaired in overweight and obese children. Despite this, little is known on how the quality of life changes during the community-based obesity treatment programmes and how this depends on the age, onset of puberty, socioeconomic status, and weight loss during treatment.

Methods: From January 2012 to March 2015, 1,001 children were consecutively enrolled in a community-based obesity treatment programme and the quality of life was assessed using the Paediatric Quality of Life Inventory 4.0 questionnaire (PedsQL) at enrolment and annually. Height and weight were measured at each visit and information of the onset of puberty and the socioeconomic status of the parents were collected.

Results: At enrolment, 901 children completed the PedsQL questionnaire, and PedsQL total score declined with increasing BMI SDS (β : 2.7, $p = 0.01$), and in girls with increasing age (β : 0.8, $p = 0.0001$), onset of puberty (β : -4.8, $p = 0.002$), and a lower socioeconomic status (β : -3.3, $p = 0.01$). A total of 316 children completed a second PedsQL, and the PedsQL total scores increased significantly in both genders ($p < 0.05$) during the treatment, with no differences between the sexes ($p > 0.05$). The change in the PedsQL total score during treatment was independent of the age ($p > 0.05$), the onset of puberty ($p > 0.05$), socioeconomic status ($p > 0.05$), and in girls independent of the change in BMI SDS in girls ($p > 0.05$).

Conclusions: During a community-based obesity treatment programme the quality of life increased significantly, regardless of the age, onset of puberty, sex, socioeconomic status, and in girls independent of the change in BMI SDS during treatment.

Parental feeding practices and nutrition knowledge among parents having children with learning disabilities: A pilot qualitative study

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Background: It has been suggested that protein, fruit and vegetable diets are good sources of iron and fatty acids and have been associated with improvements in cognitive processes(1). Parental feeding practices influence children's diets (2) and these might also have a positive effect on cognitive development. In addition, high fat and sugar diets might impair cognitive functions(3).

Objectives: The aim of this study was to assess parental feeding practices of Mexican parents with children having LD and to determine to what extent parents promote the consumption of protein, fruits and vegetables.

Methods: This was a qualitative study (4) conducted through twelve semi-structured interviews among parents of children with LD. The interviews examined attitudes and beliefs about learning nutrition and common parental feeding practices of children with LD. Following the interviews the most frequent issues expressed by parents were identified.

Results: The most relevant issues identified by parents were: 1) identification of good quality nutrition and the relationship with the learning process of their children, 2) lack of some practices that increase healthy eating, 3) parental feeding practices of children with LD, 4) barriers and challenges to improve the nutrition quality of children with LD.

Conclusions: Although most parents were knowledgeable about nutrient recommendations for their children a lack of parental feeding practices focusing on healthy eating was identified. A quantitative tool and exploration of parental feeding practices, and nutrition knowledge among parents with children having LD are warranted.

A review of the integration of behaviour change methodologies in randomised controlled trial lifestyle interventions among overweight and obese women during pregnancy

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Background: Maintaining healthy lifestyle behaviours during pregnancy is important for maternal and fetal health. Increasing rates of maternal obesity and excessive gestational weight gain are reportedly driven by poor dietary and physical activity habits and carry high risk of health consequences such as gestational diabetes, miscarriage and fetal macrosomia. Pregnancy is an influential period, presenting a unique opportunity to positively alter health behaviours in order to benefit the mother and fetus. This can be challenging within the existing capacities of standard health care provision. Inconsistencies exist throughout the literature on the effectiveness of dietary and physical activity interventions in pregnancy.

Aims This review focuses on the use of psychologically derived behaviour change theories and techniques within dietary and physical activity interventions aiming to improve several pregnancy outcomes in overweight and obese women. Additionally, this paper examines the qualitative evidence surrounding the factors influencing behaviours in this specific obstetric population, and also, explores the use of mobile technologies as novel health behaviour change aids.

Results: Randomised controlled trials of diet and physical activity interventions in overweight and obese pregnancies remain inconsistent with respect to behaviour change theories and techniques used, measurement of behaviours and success in behavioural and pregnancy outcomes. Qualitative evidence lends useful information which may benefit the design of future interventions, and trials using mobile health technologies are in their infancy.

Conclusion: To draw conclusions, further evidence based, behaviourally structured RCTs are warranted to effectively alter antenatal behaviours, and identify successful behaviour change components within high-risk obstetric groups for implementation within clinical settings.

Personalized exercise prescription: Does it work after bariatric surgery?

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Background: Morbid obesity is a major contributor to many chronic diseases. Bariatric surgery is considered an effective treatment for severe obesity and its related comorbidities. Meta-analyses demonstrate that post-bariatric surgery patients with high levels of physical activity (PA) experience greater weight loss, reduction of obesity-related comorbidities and improved quality of life (QOL). A study conducted by our multidisciplinary program demonstrated that 60% of post-bariatric surgery patients were unable to maintain recommended PA levels due to perceived barriers. Studies have shown that a physical activity prescription (PARx) is an effective and practical method to increase PA levels and quality of life in the primary care setting. However, PARx's have not yet been tested in the post-bariatric surgery population.

Objectives: The objective of this study was to examine if a PARx improves PA and QOL in bariatric surgery patients at 6 months and 1 year postoperatively.

Material and Methods: In this prospective RCT, 100 post-operative bariatric surgery participants were randomized to receive either a personalized PARx or the usual care which included general exercise recommendations as reflected by the Canadian Physical Activity Guidelines. The principles behind providing a physical activity prescription also echoed the Canadian Physical Activity Guidelines, but provided the patient with specific, written instructions to increase the intensity, frequency, or duration of activity to meet guidelines. Data was collected at two time points: 6 months and 1 year post-operatively. PA level, QOL, BMI, percentage of weight loss and waist circumference were compared between the two groups using a paired t-test.

Results: Preliminary results will be presented from data collected at the 6 month time point. We will compare PA level, QOL, BMI, percentage weight loss and waist circumference between the two groups using a paired t-test.

Conclusion: The study will enable us to determine if a PARx motivates patient to increase their physical activity, and if that has an effect on long term QOL, BMI, percentage weight loss and waist circumference.

PO2.089

Portion size selection and energy intake in the US population, a modeling case-study

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Introduction In the US and globally, portion sizes and the obesity prevalence have been growing hand-in-hand for the past 50 years [1]. Reducing portion sizes of popularly consumed foods, like pizza in the US, has been proposed as a key and cost-effective strategy against obesity [1,2]. Objective To assess in the general US population the impact on energy intake of shifting pizza consumption from declared portion size to the regulated portion size (RACC, 140g).

Data and Methods: Dietary intakes were derived from the first 24-hour recall of the 2011–12 NHANES survey, for 7456 participants aged 4 and above. Energy intake of children and adolescents (C&A) aged 4 to 18, and of adults aged 19 and above were analyzed in three scenarios: Baseline, Observed intakes as reported in the 24-hour recall; RACC1, All reported pizza consumption occasions set at 140g (RACC); RACC2, All pizza consumption reported above 140g was set to 140g. Intake was analyzed in the whole population and among pizza consumers only.

Results: 12.9% of all participants declared eating pizza, with a higher prevalence in C&A (20.8%) compared to adults (10.8%). Mean declared portion sizes were higher than the RACC in both C&A and adults, with more adults reporting portion sizes above the RACC (Table). Some individuals did report consuming pizza more than once in the day. In both RACC1 and RACC2 scenarios, the average energy intake was significantly reduced compared to Baseline (Figure). The RACC2 scenario led to an average reduction of 43kcal in all C&A; and of 208kcal in pizza consumers. In adults, these reductions reached 39 and 356kcal, respectively.

Conclusion: The present case-study, based on a single food category, highlighted that action on serving sizes even in a single food source can be linked to strong reduction in energy intake. Within the overall framework of healthier food choices promotion, more focus should be put on portion size selection, building on identified levers for such choices [3].

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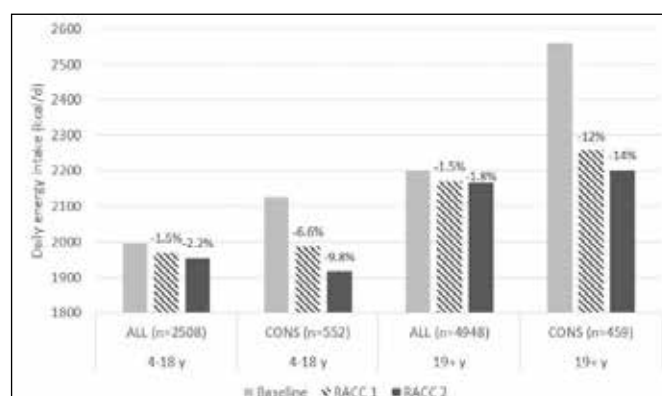


Fig. 1. Average energy intake of US children and adolescent (aged 4 to 18) and adults (aged 19 and above), in the whole sample (ALL) and among pizza consumers only (CONS), at Baseline and in RACC1 and RACC2 portion size selection scenarios.

RACC1, All reported pizza consumption occasions set at 140g (RACC); RACC2, All pizza consumption reported above 140g was set to 140g. % on top of RACC1 and RACC2 bars indicate % reduction compared to baseline. All reductions were significant ($p < 0.001$) Data: NHANES 2011–12, Day 1 24-h recall

Table 1. Reported pizza portion size among pizza consumers (NHANES 2011–12, Day 1)

	n pizza eating occasions	Mean (g)	SE	% above RACC	Median (g)	Min (g)	Max (g)
Children and adolescents, 4–18y (n = 552 pizza consumers)	638	180	w4.44	49.4	139	6.5	656
Adults 19+ y (n = 459 pizza consumers)	542	235	7.38	62.4	194	11.5	996

PO2.090

Increased prevalence of ADHD, autism spectrum disorder and other neurodevelopmental disorders in obese children

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Background & Aims: Child obesity has become a global health problem. The younger treatment starts the better outcome, but and few treatment modalities are efficient. An increasing body of evidence shows that children with neurodevelopmental disorders have an increased risk of obesity. Whether obese children have an increased risk of neurodevelopmental disorders with worse treatment outcome is not studied.

Objectives: To investigate the prevalence of ADHD, autism spectrum disorder (ASD) and, other neurodevelopmental disorders in obese children.

Material/Methods: Seventy-six children (37 girls; 39 boys) were recruited at referral to a university outpatient clinic. The parents were interviewed regarding the child's psychiatric morbidity using The development and well-being assessment, and completed parental questionnaires pertaining to ADHD, ASD and other neurodevelopmental disorders. The parents were screened for adult ADHD using the Adult ADHD Self-Report Scale. Anthropometric and metabolic data was collected at the first visit and after one year of conventional life-style treatment.

Results: Twelve percent 1% and 18% of the children were diagnosed with ASD and ADHD respectively. Thirty percent of the children had at least

one neurodevelopmental disorder and 20% had a parent who screened positive for adult ADHD. There was statistically significant more obese males with neurodevelopmental disorders ($P < 0.05$). In the total group, mean (SD) body mass index (BMI) was 3.4 (0.6), insulin 31 (18.5) and age 12.4 (3.0), with a range of 2–6 kg/m², 6–110 and 5.1–16.5 years, respectively. There was no statistical difference in mean BMI, insulin, age and other metabolic variables between those obese children with neurodevelopmental disorders and without. No difference was found in treatment outcome after one year between those with neurodevelopmental disorders and without (delta BMI SDS 0.06 (0.36) versus 0.13 (0.33), $P = 0.5$).

Conclusions: Neurodevelopmental disorders are overrepresented in clinical populations of obese children, especially in males. Moreover, many parents share their children's symptoms, which should be taken into account when designing educational materials although we did not find any significant worse BMI outcome in those with neurodevelopmental disorders.

Reference:

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PO2.091

"The balloon was just the kick start to get things going, the rest I realised I need to do it for myself"; Adolescent experiences from an intra-gastric balloon as an adjunct to a lifestyle programme: Qualitative study 12 months on

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Background and Aims: Severe obesity is the fastest growing sub category of obesity amongst adolescents yet current treatments are of limited effectiveness (Luuthkuis et al, 2009). Little is also known about severely obese adolescents and their families' experiences with obesity treatments. This study offers important insights into the adolescent experiences of those participating in a novel treatment – Insertion of an intra-gastric balloon for 6months as an adjunct to a lifestyle support programme. The aim was to explore the acceptability of the intervention and to understand participant experiences of treatment, and quality of life outcomes. Method Participants took part in two semi-structured, audio recorded, interviews at 3 and 12 months ($n = 9$) post baseline. Open-ended questions provided a deductive framework around 5key topics; expectations of the intervention, successful and unsuccessful changes, unanticipated setbacks and acceptability of the programme.

Results: All of the adolescents and families welcomed the opportunity to participate in an intra-gastric balloon and lifestyle programme. At 3 months the adolescents held hope that the intra-gastric balloon would stimulate weight loss helping overcome previous failures to lose weight. At 12 months though, there appeared to be a cognitive shift, from a reliance on the intra-gastric balloon, to an attribution of their own intrinsic behaviours to successfully lose weight. Parental modelling appeared crucial to successful weight loss, with individuals who were actively involved in making changes, planning food shopping and being physically active, losing more weight. Additional behavioural support was requested post intervention in order to help maintain positive changes within the home-based environments.

Conclusion: The intra-gastric balloon and lifestyle programme offered an educational opportunity for the individuals and families albeit weight loss was not as high as they perceived. Adolescents struggled to maintain positive lifestyle changes post intervention. The role of parental health behaviors appears crucial, with the home environment and familial role requiring further exploration within obesity treatment programmes.

Reference:

Luttikhuis H, et al (2009). Interventions for treating obesity in children. The Cochrane Library.

PO2.092

Implicit and Explicit Weight Bias among psychology students

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Background: A high prevalence of anxiety and depression are associated with stigmatizing attitudes towards obese people (1). Psychologists play an important role in the prevention and treatment of the emotional psychopathology toward people related to any kind of fat. A previous study conducted in México showed a high fat explicit bias among psychology students (2).

Objective: The aim of the study was to assess implicit and explicit fat bias among psychology students from a Mexico-US border university.

Methods: A cross-sectional study was conducted with eighty- two first year psychology students, using the fat phobia F-scale (3) to assess explicit bias, which contains 14 pairs of adjectives that describe people with obesity. Implicit fat bias was assessed using weight-IAT (4), which is a validated measure of automatic thoughts and attitudes related to the period between the display of a fat or thin human image and the positive or negative words expressed and associated with them.

Results: The student average age was 20.1 yo. Students achieved a mean F-scale of 2.84, which suggest moderate explicit bias. Only 6% of the participants showed positive o neutral attitudes toward people with obesity (≤ 2.5 points). The mean IAT's D-score was 0.39, which suggests moderate implicit bias.

References:

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PO2.093

Losing weight and maintaining healthy lifestyle with help of patient organization STOB

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STOB

Introduction: Primary health care alone cannot take long-term care of obese and overweight people. Patients' organizations therefore represent a very important part of obesity management in the Czech Republic. One of patients' organizations involved in weight management counselling is STOB.

Methods: The majority of weight-loss programs offer only education. That impersonal approach is not successful in installing long-term change of behavior. The STOB program is based on a method of cognitive-behavioral psychotherapy of obesity that gives practical instructions for permanent weight reduction. Patients can choose between programs with personal participation (weight reduction courses, individual counselling week long weight-loss and fitness holiday programs) or to work via internet. The main part of the activity of our organization is a community website STOBklub, www.stobklub.cz, which has more than 152.000 registered members, the majority being women (145.000+ users). STOBklub offers to users many tools according to their readiness to change their habits. STOBwheel, e-books, video-courses, World Obesity Day programs, self-coaching consisting of food-coaching, fit-coaching and psycho-coaching, the system of "traffic lights" offering an immediate feedback, regular week challenges or tasks, motivational competitions aimed at rising level of physical activity of participants (Walk around the globe, in its 4th year already), individual motivation and professional advice in need and other tools.

Conclusion: Nowadays an activity of self-help organization STOB – patient organization focuses on programs addressing many people at low

cost. The activities involve not just weight reduction but mainly maintenance of a weight loss. We would like to help people not only to acquire knowledge but also to transfer it into real life situations. Members of STOBklub form motivational groups with long-term personal support.

PO2.094

The Childhood Obesity Treatment Protocol adopted into a Community-based Treatment Programme

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Background: Due to the alarmingly high prevalence of childhood obesity, there is a need for efficient and highly accessible obesity treatment programmes with great capacity. Community-based treatment may meet these needs, however, only a minority of studies have been conducted in this setting.

Methods: An efficient hospital-based treatment protocol, The Children's Obesity Clinic's Treatment (TCOCT) protocol, was adopted into a community-based treatment programme, and the changes in body mass index (BMI) standard deviation score (SDS) during 1.5 year of treatment were analysed. The inclusion criteria for engaging into treatment were age 3–19 years and a BMI SDS above 1.28. No other eligibility criteria were applied.

Results: From July 2012 to March 2015, 1001 children (455 boys) were enrolled into treatment. At enrolment, the median age was 10.9 years (range 3.0–18.3) in boys and 10.8 years (range 3.2–18.0) in girls, and the mean BMI SDS was 2.93 (CI95% (2.85–3.01) in boys and 2.53 (CI95% (2.48–2.58) in girls. During treatment 650 (65%) of the enrolled children reduced their BMI SDS. After 1.5 years of treatment the mean reduction in BMI SDS was 0.38 ($P < 0.0001$, CI95% (0.30–0.45) in boys and 0.18 ($P < 0.0001$, CI95% (0.12–0.25) in girls. A total of 278 children (28%) dropped out. Of those, 74 children (27%) attended only a single consultation, 72 (26%) children increased their BMI SDS non-significantly by a mean of 0.17 BMI SDS ($P = 0.07$, CI95% (-0.35–0.015)), and 132 children (47%) decreased their BMI SDS by a mean of 0.34 ($P = 0.0003$, CI95% (0.16–0.52)). On average, 4.7 health professional hours were spent per child per year.

Conclusion: During the community-based childhood obesity treatment programme based on the TCOCT protocol, we found significant reductions of the degree of obesity and an acceptable dropout rate at a low time cost.

PO2.095

GLP-1 is both anxiogenic and antidepressant; divergent effects of acute and chronic GLP-1 on emotionality

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Glucagon-like peptide 1 (GLP-1), produced in the intestine and hind-brain, is known for its glucoregulatory and appetite suppressing effects. GLP-1 agonists are in clinical use for treatment of type 2 diabetes and obesity. GLP-1, however, may also affect brain areas associated with emotionality regulation. Here we aimed to characterize acute and chronic impact of GLP-1 on anxiety and depression-like behavior. Rats were subjected to anxiety and depression behavior tests following acute or chronic intracerebroventricular or intra-dorsal raphe (DR) application of GLP-1 receptor agonists. Serotonin or serotonin-related genes were also measured in the amygdala, DR and the hippocampus. We demonstrate that both GLP-1 and its long lasting analogue, Exendin-4, induce anxiety-like behavior in three rodent tests of this behavior: black and white box, elevated plus

maze and open field test when acutely administered intraperitoneally, into the lateral ventricle, or directly into the DR. Acute central GLP-1 receptor stimulation also altered serotonin signaling in the amygdala. In contrast, chronic central administration of Exendin-4 did not alter anxiety-like behavior but significantly reduced depression-like behavior in the forced swim test. Importantly, this positive effect of Exendin-4 was not due to significant body weight loss and reduced food intake, since rats pair-fed to Exendin-4 rats didn't show altered mood. Collectively we show a striking impact of central GLP-1 on emotionality and the amygdala serotonin signaling that is divergent under acute versus chronic GLP-1 activation conditions. We also find a novel role for the DR GLP-1 receptors in regulation of behavior. These results may have direct relevance to the clinic, and indicate that Exendin-4 may be especially useful for obese patients manifesting with comorbid depression.

PO2.096

Obesity: Analysis of the use of a comprehensive care system to change the lifestyle, through a retrospective study. Evolution of therapeutic tools, and impact on the thresholds

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We understand obesity is closely related to lifestyle; where the context and meanings about commensality and the automatism of habits, represent the backbone that sustains the disease, and in turn these patterns of behavior sustained over time leave a neuroendocrine footprint that demand more therapeutic resources to be modified; Our therapeutic setting is an integral and interdisciplinary dynamic approach, with a multicentric experience of 23 years. Through a retrospective analysis of 13 years database, we observed patient's behaviour in the face of therapeutic adaptations implemented in the institution. The used programs were Markie and Microsoft Excel.

Results: Total population 31815 patients (75% female, mean age in years (SD): 44.20 (11.6)). Significant differences between an early period 1 ($P = 1$) 2003 to 2011 were observed, and one late in the 2011–2015 ($P = 2$) which had already settled many strategic therapeutic adaptations: Patients reached the maintenance first time: $P1 = 13\%$; $P2 = 53\%$. Patients that returned to the system: $P1 = 1r$ ($r = \text{re-entry}$): 25% ; At least $2r$: 8.6% ; At least $3r$: 3% ; At list $4r$: 1% . $P2 = 1r$: 36% ; $2r$: 12% ; $3r$: 2% ; $4r$: 0.35% . Weight threshold recovered: $P1 = 90\%$ returned at least once with weight regain but less weight than income; 78% returned at least one more time but with less weight than they had in the first return; 77% less weight than the second return. $P2 = 92\%$ returned at least 1 time but with less weight than the start; 81% patients returned at least one more time but less than the last weight; 92% returned at least one more time but with less weight previous. Number of active groups in maintenance: $P1 = 1$; $P2 = 6$. Rate asset maintenance patients: $P1 = 0.2\%$; $P2 = 12\%$.

Conclusions: The adjustments of the professionals to the needs of patients, and maturation of resources has a positive impact on the thresholds and therapeutic goals.

Reference:

1 Relapse prevention training and problem-solving therapy in the long-term management of obesity. Perri. Journal of Consulting and Clinical Psychology, Vol 69(4), Aug 2001, 722–726.

PO2.097

Evaluation of the efectivity of individual education treatment: Demographic and nutritional status association

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Treatments to nutritional disorders have been conducted by individual counseling or by groups resulting in different effectively rates. In any

strategy, biopsychosocial aspects should be considered. In this paper we sought to determine whether the factors age or schooling or severity of nutritional disorder are determining the effectiveness of nutritional counseling.

Objectives: (i) assessing body mass and behavioral changes in adult patients after individual nutritional counseling; (ii) verify whether age, instruction level and nutritional status are determining on the effectiveness of treatment.

Methodology: descriptive study carried out in the Nutrition Center in the University of São Paulo State (Brazil) between 2014 and 2015; height and weight were obtained and body mass index (BMI) calculated; dietary data were evaluated by recording the consumption of food 24 hours (R24hs). To assess body mass changes was obtained the percentage of weight loss (% PP) after the nutritional intervention; and to assess behavioral changes (BC) R24hs were checked, classifying them as: no changes, partial or complete adherence to counseling. The counseling occurred every 15 to 21 days and included 4 items according physiological needs and life style. % PP and BC were associated with initial nutritional status, age and schooling of patients. It was used chi-square and Fisher's Exact Test, with $p < 0.05$.

Results: 102 patients were followed, most women (87.3%), and 9 (37.3%) or 12 years (38.2%) of schooling, and mean age was 37 (20–70 years old). According to BMI, a third had normal weight, 49% overweight and 11.8% obesity III. Patients were followed at least two consultations. After the intervention, the average of %PP for obese was higher than for overweight patients (1.6% vs 0.08%); and more evident in obese class III (2.77%). Regarding BC, obese also had greater adherence than non-obese ($p = 0.017$). Most had partial adherence (52.1%) or total (43.8%) to counseling. There were no associations between % PP or BC and the patients' age or schooling.

Conclusion: the individual intervention proved to be effective according % PP and BC; more severe obese patients responded better to the guidelines. But there is no association between the effectiveness and social demographic characteristics.

PO2.098

Possibilities of a short intervention for physicians working with obese people

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Introduction: Obesity represents a serious health and social problem. In the Czech Republic a comprehensive weight management program was formed. This approach integrates a broad scale of professional therapeutic possibilities from specialized medical care at clinics to activities of patients' organizations. STOB (STop OBesity) is one of patients' organizations involved in weight management counselling. One of the STOB activities consists in developing methods of short intervention for primary health care.

Methods: General practitioners have at their disposal recommended diagnostic and therapeutic procedure for working with obese and overweight patients. These recommendations are often difficult to put into practice. Each patient needs an individual treatment plan and general practitioners have not enough time to create it. STOB developed a methodology for a short intervention for patients. The methodology is based on self-help personal plans (brochures). These plans give advice how to increase motivation, how to improve eating habits, exercise habits, and how to manage psychology problems (internal and external stimuli provoking extra eating). During a visit to the doctor a patient gets a short questionnaire that helps a physician to identify easily the main cause of patient's increased weight. Based on this result a patient gets from the doctor one of the self-help plans. The plans are based on principals of cognitive-behavioral therapy. A patient sets himself or herself a clearly defined interim goal and by means of slow, gradual steps head towards its achievement with the intention for change of habits to be permanent. Thus a patient gets from the doctor a concrete tool ready for immediate application.

Conclusions: STOB offers to the professionals who lack enough possibilities (time etc.) practical materials for motivating patients, changing their habits, setting realistic targets and creating individual treatment plans. These materials will help them to carry out a recommended procedure for therapy of obese patients. Grant support: MHMP DOT/04/03/005081/2015

PO2.099

Fist results from the austrian Prevention Project EDDY again the development of obesity and cardiovascular risk factors

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Background: Overweight and obesity are rising problems in Europe. The World Health Organization declared the prevention of obesity as a high priority scientific research objective. Data from the HELENA study demonstrate a prevalence of about 20% overweight adolescents in Austria. Approximately 43% of all deaths in Austria are reduced to diseases of the cardiovascular system, which are strongly associated with overweight and obesity. Therefore it is necessary to find strategies to combat obesity and its origin.

Methods: The EDDY project is an interventional cohort study with a duration of two years scaled in an intervention group and a control group. The intervention group received a comprehensive, age-appropriate 20-hours nutrition training and a five-hours physiological training as well as a 20 hours sport and exercise intervention. Before and after intervention and at two follow-ups, subjects were physically measured (BIA, height). Additionally the knowledge of nutritional issues and eating habits as well as psychological parameters were measured with adequate questionnaires.

Results: The body fat percentage of the subjects in the intervention group was reduced in a nonsignificant extend after intervention. Nutrition knowledge improved in 10 of 12 categories surveyed and the consumption of junk food and sweets was reduced significantly after intervention.

Conclusion: The data indicate that an intervention based on nutrition knowledge and on stimulating daily physical activity is able to improve the nutrition habits and possibly the health status.

PO2.100

Treatment of adolescents with under- or overweight by stress regulation exercises: An SMS-supported randomized controlled study*

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Background: Psychological strain or high impulsivity may affect eating habits due to impairment of stress regulation. Hence, in patients with under- or overweight, signs of stress as increased cortisol secretion or abnormal skin conductance are found. Relaxation or reduction of stress supported by biofeedback may be an approach to overcome eating problems and improve weight status. In addition, adolescents' adherence to treatment schedules often is insufficient. The purpose of this study is (1) to test, whether during biofeedback supported home training, individual relaxation interventions are superior to individualized food stimuli training to attain stress reduction and improved weight, and (2) to test utility of an automated SMS reminder system.

Methods: In a randomized controlled study enrolling 20 overweight (BMI 25–30 kg/m², age 14–19, 50% female) and 20 underweight adolescents (BMI 14–16 kg/m², age 14–19, girls only, secondary amenorrhea), 10 of each group perform individualized home relaxation exercises, while 10 of each group exercise with individualized food stimuli twice a day. Additionally all subjects receive a lifestyle therapy (nutrition counseling,

physical activity training, and psycho education). After baseline medical evaluation, individual relaxation or food stimulus tools are defined first. At start (T0) of training with the individualized tool and four weeks later (T1) as well as at follow up-visits after 7 and 10 weeks (T2, T3), BMI and cortisol in blood and saliva as well as stress levels (Self-Assessment Manikin, Trierer Stress Inventory) are assessed. During four weeks all subjects are encouraged to practice twice a day and to report well-being (KID-SCREEN) via SMS coach..

Results: First data in three female adolescents (2 overweight, 1 underweight) resulted in a response rate of 91% out of all SMS at T1. BMI-SDS changed into healthy direction by 6.6% SD in all 3 girls. Well-being (vitality) was 3.7/6 at start and 4/6 at T1.

Conclusion: SMS guided home exercises seem to improve weight and reduce stress in adolescents. This kind of health care at distance may support adherence to weight management programs in adolescents.

PO2.101

TNO acting as a Field Lab for Health Measurements; effects on health and behavior

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Background & Aims: Wearables and self-tests nowadays give individuals the opportunity to measure several aspects of their health, like physical activity and blood sugar, with increasing accuracy. These measurements contribute to an individual's awareness of their health and as such serve as a motivator to improve health. However, it is not known to which extent this increased awareness contributes to behavior change and improved health status.

Objectives: This study aimed to evaluate whether increased awareness of health status by self-monitoring health parameters serves as motivational instrument for changing health behavior. **Materials & methods** The study is designed as an open, exploratory, one-group study. Healthy volunteers (18–67 years) with a sedentary lifestyle were recruited at three TNO locations in The Netherlands. The three-month intervention consisted of self-monitoring various health parameters. Subjects were equipped with do-it-yourself devices for measuring blood pressure, blood glucose, body weight, food intake and physical activity. Sampling using these devices was done with varying frequencies. Effects of self-monitoring on health (behavior) were assessed by comparing baseline values for health parameters with the values at the end of the study, applying $n = 1$ statistics.

Results: 33 TNO employees started the study and 31 subjects completed the study. From the n -of-1 statistic approach a significant effect on weight loss (slope = -0.1 kg) and BMI (slope = -0.27) was found. Energy expenditure increased significantly with 41.2 kcal/day (sd=22.7) during the study. No effect was found on blood glucose or blood pressure. The results from the user experience questionnaire showed that 86% of the participants felt that participation in the study improved the insight in their own health status, and 51% of the participants agreed that the use of do-it-yourself devices helped them to improve their health.

Conclusions Self-monitoring of health parameters had a positive effect on body weight, which could be explained by increased energy expenditure. Also, for most of the participants self-monitoring increased awareness of own health status. This is a promising result for application of wearables for health awareness and improvement.

PO2.102

Body weight re-gain: Comparing the effectiveness of short-term and medium psychotherapeutic approaches

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Introduction: Risk of weight regain is a great problem for all people, who managed to lose weight even after specialized programs. We have launched 2 CBT-programs for those patients who faced weight regain after initial psychotherapeutic program.

Methods: The first program is called Express-Support Group (ES-group, 207 participants were examined). It takes 8 hours of psychotherapy process, divided into 2 meetings during 2 weeks in groups of 8–15 patients. The second approach is called Slim Academy (SA-group, 106 participants were examined). It takes 24 hours of psychotherapy process, divided into 8 meetings 3-hours long in groups of 8–15 patients. We have measured the effectiveness of both groups and compared it with the effectiveness of basic approach (Control Group, 777 participants were examined), which is based on CBT with elements of hypnosis and other psychological techniques. The purpose is to begin the new phase of weight reduction. The effectiveness was measured after 1 month from the beginning. Research was conducted from 2012 to 2014 in Tomsk, Russia.

Results: The initial body weight in ES-group was 80,79 kg, in SA-group 92,69 kg, in control group 93,23 kg. The results of body weight reduction is shown in table 1

Conclusion: Initial body mass was much lower in ES-group compared with SA-group and control group. We can suppose that people with initial period of weight regain process prefer to use short-term program, while people with “heavy” weight regain have to use longer group. Results: in both groups for weight regain patients were worse comparing to control group.

Program	Weight loss dynamic in % from initial body mass after 1 month	Number of participants (%) who lost given percentages from their initial body mass			
		0% or weight regain	0-5%	5-10%	10-15% and more
ES-group	3,51±2,57	13,52	47,83	36,24	2,41
SA-group	4,13±2,46	2,42	64,24	32,73	0,61
Control group	5,55±2,45	3,86	34,88	58,81	2,45

Fig. 1.

PO2.103

Is education level a predicting factor for high drop-out rates in obesity treatment?

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Objective: Obesity treatment is a hard, long treatment where the full commitment and participation of the patient is necessary. The patients who apply to obesity outpatients clinics are supposed to have the needed motivation for this contribution, but high drop-out rates in the clinics tell completely a different story. In this study, we aimed to search for the obesity treatment drop-out reasons focusing on the education levels of the patients.

Methods: We included 60 patients who applied to obesity outpatient clinic in the first 3 months of 2014 in the study and their files were screened. They were divided into 2 groups as patients who attended their follow-up sessions regularly and who dropped out anytime after the first session. Their ages, education levels, accompanying diseases, medication usage, insulin resistance (IR) and metabolic syndrome (MS) rates were recorded and evaluated using SPSS.

Results: The drop-out rate was 80% (48=n, mean age:43 years), only 12 patients (20%, mean age:50 years) attended their follow-up sessions regularly. All patients were female, with accompanying diseases and on multipl

medications. Again, they all had IR and MS. In drop-out group: 1 patient (2%) was illiterate, 21 patients (44%) were primary school graduate, 5 patients (10%) were secondary school graduate, 9 patients (19%) were high school graduate and 12 patients (25%) had university degree. In follow-up group: 1 patient (8%) was illiterate, 8 patients (67%) were primary school graduate, 1 patient (8%) was secondary school graduate, 2 patients (17%) were high school graduate and there were no university graduates. The mean weight loss after 3 months was 2.1 kg in follow-up group.

Conclusion: Education level didn't particularly effect the attendance rates to obesity outpatient clinic. Difficulties related to metabolic problems weren't considered causative as both groups were metabolically similar. Our observation is that; the patients who apply to obesity outpatient clinics have usually unrealistic expectations and aren't willing to follow a diet and exercise program and tend to ask for a quick solution like a miracle medication. And when reality doesn't meet their expectations, they prefer to look for it somewhere else even though they're well educated.

PO2.104

Supporting Adolescent Health: Taking agency seriously

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Introduction: There is a call for action to tackle differences in health outcomes and support the adoption of healthier behaviours in adolescents. By reflecting on the barriers to adopting healthier behaviours experienced by young people, this paper argues that, to effectively support adolescent health, strategies must take considerations of agency seriously.

Methods: The paper draws on policy documents, empirical studies, and philosophical insights into freedom and capability, agency, and autonomy development.

Results: An ecological approach to understanding health reveals a web of factors, many amenable to policy interventions, which influence health. One way that policy might support adolescent health is to offer young people increased opportunities for adopting healthy behaviours, for example facilities for sport and physical activity, and education about healthy choices. However, opportunities alone are not sufficient. We must also consider how worthwhile those opportunities are to young people, and how 'real' those opportunities appear to be to them. In short, we need to take seriously the needs of adolescents, their ability to take up opportunities, and the barriers that they experience. There are many barriers to taking up opportunities for health. Certain barriers come down to lack of skills or knowledge; others make taking up opportunities costly, by demanding unreasonable compromises. Some barriers are less tangible, for example stigma, discrimination, or lack of self-efficacy. Together, these factors contribute to a person's agency; their ability to form their own plans, act on their own choices, and take responsibility for their actions. Adolescence is a time when individuals undergo many changes, and when future health outcomes are bound to be low on adolescents' lists of priorities. This is also a time when many of the skills and attitudes conducive to agency can be developed or, equally, undermined. Consequentially, considerations of agency are particularly salient during adolescence.

Conclusions: When reflecting on how policies can support adolescent health, we must take considerations of agency seriously. This means responding to what is important to adolescents, and developing strategies for fostering the skills and attitudes that enable young people to actually take up opportunities for better health during adolescence, and in the future.

PO2.105

Psychological features of school-age children with obesity

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Objectives: Identify the psychological characteristics of obese children in accordance with gender and age.

Material & Methods: The study involved 26 children aged 8 to 17 years (13 boys, 13 girls). 15 children with first degree of obesity and remained 11 children with second degree. Study used questionnaire method based on the following tests: Scale lie D. Marlou- D. Crown Thomas-Kilmann Instrument Conflict Mode, questionnaire Bassa- Darksy, questionnaire rigidity.

Results: High rates of "depending on favorable evaluations from other people" registered for girls in 30.7%, boys - 7.69%. "High" hostility observed in 61.54% for boys and 46.15% for girls. "High" rate of aggression - 38.46% for boys and 30.77% for girls. Higher performance of "depending on favorable evaluations from other people" in the ages range of 8 to 12 years ($r = 0.79$), as well as "higher" levels of aggression and hostility in children group of 8 up to 12 years ($r = 0.57$ and $r = 0.43$ respectively) were revealed. In the analysis scale of "social desirability" for children aged 8-12 years "high" parameters found in 30% of cases, while for children aged 12-17 in 50% of cases. Medium and "high" rigidity noted in 80-90% of cases and had no age-related differences. With first degree of obesity high and average rigidity observed in 100%, high social desirability - in 47% of cases. In second degree of obesity - 72% and 27% respectively. High rates of "depending on favorable evaluations from other people" at the first degree of obesity were observed in 40% of children in the second degree of obesity - 18% of children. High levels of aggression and hostility at the first degree of obesity were 27% and 47%, with second-degree of obesity - 37% and 64%, respectively.

Conclusion: Psychological support of obese children should be differentiated according to sex and age.

PO2.106

The Relationship between Eating Behavior and Obesity

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Obesity that can be affected by the impact of ethnicity and cultural behavior is a major health problem. Many non-genetic factors, like lifestyle, eating habits, living environment, ethnic origin may cause to gain weight and increase body fat. The eating habits, the lifestyle and living environment of obese people are important in order to effective weight loss. Obesity, which is considered one of the most important health problems of the era, is pioneer in the development of many metabolic conditions like type II diabetes and cardiovascular disease. Lose of weight is great importance in the treatment of these diseases. Especially in recent years, changes of lifestyle and eating behavior have been adopted to lose weight for the treatment of obesity-induced metabolic diseases. Existence of food responsiveness, enjoyment of eating, satiety responsiveness, eating in the absence of hunger, reinforcing value of food, eating disinhibition and impulsivity/self-control should be investigated application of eating behavior changes in obese patients. In studies, it is emphasized that these factors related to gain weight, increase fat mass, increase body mass index. Especially, it was reported that individuals' eating behaviors might be change under stress factor. Chronic life stress, more and more impact on people in recent years, prolongs the instant eating behavior changes and this situation may be cause gain weight. As a result, it is important to know the eating behaviors and living environment of obese people in order to determine the weight loss program that will be administered to the patient.

References:

French SA, Epstein LH, Jeffery RW, Blundell JE, Wardle J. Eating behavior dimensions. Associations with energy intake and body weight. A review. *Appetite* 2012;59:541-549.

PO2.107

Intensive Chronic Disease Management Program For Shift Workers In a Biscuit Factory

Kelly, R.

Ray Kelly Fitness – Exercise Physiology

Background and Aims: Arnotts is an iconic Australian brand, providing generations of Australians with their favourite biscuits. They provide a work environment that encourages employee loyalty, with the average worker being there over 20 years. This aging workforce has provided a growing problem with chronic disease and soft tissue injuries.

Objectives: To improve the food choices of employees and increase their physical activity. This in turn will improve their overall health and well-being, reduce the instance of chronic disease and reduce soft tissue injuries. **Material & Methods:** In June 2014 we commenced a 10 Week Health Program that saw 53 employees from 4 employee groups (Day Shift, Afternoon Shift, Night Shift and Administration) participate in a coaching program that had them receiving 1 x 15 minute consultation each week. Within these consultations they were provided with an exercise program and meal plan and this was adjusted each week to suit their lifestyle and individual circumstances. The program is based on Ray Kelly's clinical program which is used within his medically supervised chronic disease centres. The meal plan consisted of fresh, unprocessed foods and the exercise program has the participants walking most days, at a low to moderate intensity.

Results: Over the 10 weeks, the 53 employees lost a total of 643kg (1417lb), an average of 12kg (26lb) per participant. In the initial screening, 36 of the 53 participants were found to have had high blood pressure (Systolic >140, and/or Diastolic >95). At the completion of the program only 5 of the 53 participants still had blood pressure readings exceeding this level. All employees reported an increase in physical activity and improved food choices. At the 6 month follow up, the average employee weight was still within 600g (1.3lb) of their end of program weight.

Conclusion: The participants came from a range of cultures, were shift workers and most had English as a second language. They were all overweight/obese and had biscuits freely available. Even with all of these obstacles they were successful in achieving their goals. This program shows that an intensive work place health program can be effective.

Table 2. Reduction in Body Weight – This Table shows the changes in body weight distribution, comparing the starting body weight to the final body weight.

	Week 1	Week 10
50kg - 59.9kg	0	2
60kg - 69.9kg	6	8
70kg - 79.9kg	7	17
80kg - 89.9kg	13	11
90kg - 99.9kg	9	7
100kg - 109.9kg	8	4
110kg - 119.9kg	5	3
120kg - 129.9kg	4	2
130kg - 150kg	2	1
>150kg	1	0

PO2.108

The addiction model of obesity in humans and companion animals

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Introduction: Obesity in humans and in pets is a frustrating, major health problem and is on the increase. Intuitive explanations of the causes, e.g. poor nutrition and sedentary activity, are being challenged. Obesity interventions in both pets and children have produced modest short term and poor long term results. New strategies are needed. The aim of this research project was to identify new strategies for obesity management for people and pets that are more effective on the long term.

Materials/Methods: To this end a literature search was performed and combined the current understandings between medical doctors and veterinarians treating obese patients. Long term effect studies in people and pets were used to get insight in the reasons for treatment failure. From these ideas, a new strategy for treatment of obese patients was determined.

Results: A novel theory posits that obesity in pets and children is due to "eating addiction." "Co-dependence" on the part of the "pet-parent" and child-parent, owing to affection garnered from the pet/child when treats/food are given, fosters this addiction. Both people and animals, as well as their caretakers go through classical withdrawal symptoms that are known from addiction treatments. Discussion and

Conclusion: An applicable treatment for child obesity should thus consist of classical addiction withdrawal/abstinence techniques, as well as behavioral addiction methods. Sharing information between the fields of pet and child obesity would mutually benefit each other.

PO2.109

Association of Physical Activity and Childhood Obesity Observed by Chinese School Headmasters

Chang, A.

Angela Chang

Background & Aims: This paper examined school personnel's perceptions of obesity as a problem among school-aged children and their views on factors contributing to obesity.

Objectives: This study represented an effort in understanding capacity of physical activity in moderating childhood obesity.

Material/Methods: School headmasters in a metropolitan city of Taiwan were invited to participate a structured questionnaire survey in 2014.

Results: A total of 23 samples composed of school size with students number range from 196 to 2,219 (student mean = 613, SD = 535) and with faculty number range from 10 to 155 (faculty mean = 58, SD = 38) were collected. The respondent comprised 91% (n = 20) males, aged between 27 and 64 years (age mean = 45 years, SD = 1.7). In addition to describing means and proportions across the nutritional education and physical activity, rank correlation coefficients (Kendall's tau) were calculated and tested for statistical significance. The total hours spent on physical activity were 1.84 (SD = 0.695), 2.13 (SD = 0.583), and 2.28 (SD = 0.632) for lower, middle, and higher graders, respectively. The results of a correlation analysis demonstrated a significant negative relationship between time spent on physical education and the rate of obesity by reporting the value of the correlation coefficient (r = -0.499, p = .0021).

Conclusion: Three factors facilitating obesity most frequently cited by school headmaster was on 'lacking physical activity at school,' followed by 'entertainment media use,' and 'food environment with poor nutrition.' The result provided a robust examination of the correlates of overweight and obesity in children and school environment which inform the development of environmental and policy interventions.

Improved HRQoL in obese subjects with high intensity training

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Background & aims Previous studies has demonstrated that high body mass is associated with a negative impact on health related quality of life (HRQoL). Obese people have been reported lower HRQoL but improvement can be achieved by weight loss and increased physical activity. The aim with this study was to examine if the intensity of training could effect HRQoL in obese people.

Objectives methods Obese subjects, BMI ≥ 33 kg/m², were randomized into a control group (CG) n=31, a high intensity training group (HITG) n=80 or a low intensity training group (LITG) n=74. A 16 weeks training intervention was performed. The exercise intensity was individually set based on an initial maximal exercise test with a range of % maximal heart rate and perceived exertion. The CG didn't receive any intervention. The subjects answered SF-36 pre and post exercise. Paired sample t-test was used to estimate the differences of pre and post score and ANOVA were used to compare the difference between the groups. A significance level $p < 0.05$ was chosen. Mean \pm SD are presented.

Results The HITG improved the physical summary scale (PCS) with 2.0 ± 8.3 points and significantly improved mental summary scale (MCS) with 3.8 ± 9.5 points. In the LITG and the CG no significant improvements were demonstrated (PCS 1.2 ± 6.2 and 0.1 ± 7.4 respectively and MCS -0.4 ± 11.8 and 1.6 ± 12.9 respectively). No significant difference between the groups were seen when changes in PCS or MCS were compared.

HITG significantly improved Physical Functioning (PF), General Health (GH), Vitality (VT) and Mental Health (MH). LITG significantly improved PF and GH. In CG no significant improvements were seen.

Significant improvements were seen when the differences between the groups were compared in PF, GH and VT with higher values for HITG compared to LITG and to CG.

Conclusion

In obese, high intensity training improved MCS, PF, GH, VT and MH and can thus be advantageous in order to increase HRQoL.

Acknowledgement Our gratitude to Professor Bengt Saltin, Copenhagen Community and the Danish Health Department.

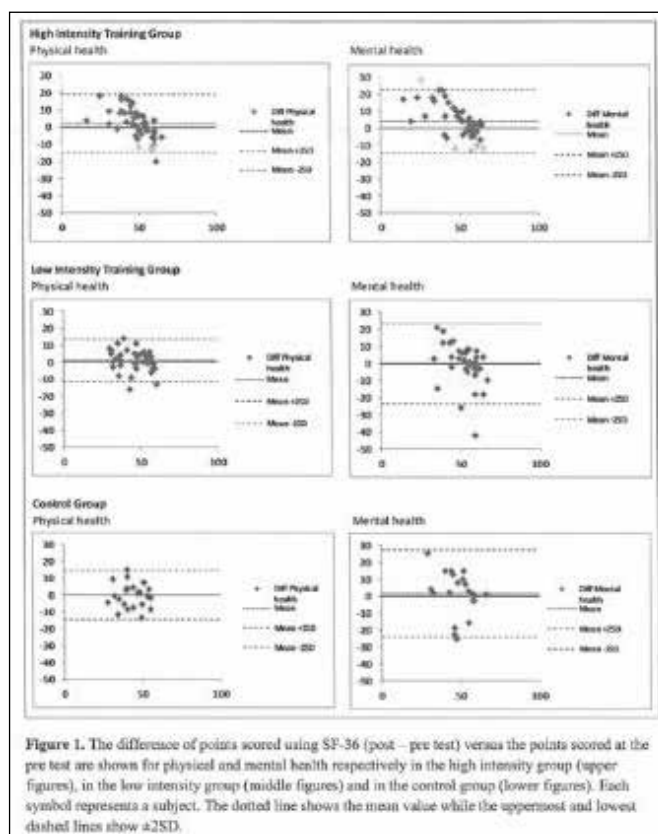


Fig. 1.

Table 1. Characteristics for each randomized group pre and post intervention (mean \pm SD (min-max)).

	High Intensity Training Group	Low Intensity Training Group	Control Group
Number [n]	49	39	16
Female/male	37/12	29/10	10/6
Age [years]	43.6 \pm 8.3 (22–65)	46.7 \pm 10.3 (21–66)	47.4 \pm 9.1 (33–63)
Pre Intervention			
BMI [kg/m ²]	41.6 \pm 5.2 (33.4–57.1)	43.4 \pm 7.6 (33.3–64.8)	44.7 \pm 7.1 (35.2–58.1)
Post Intervention			
BMI [kg/m ²]	40.5 \pm 5 (31.7–55.6)	42.6 \pm 7.9 (31.5–66.4)	44.4 \pm 7.3 (35.6–59.2)
BMI difference (test 2- test 1)	-1.1 \pm 2.1 (-6.6–3.1)	-0.7 \pm 1.7 (-5.3–1.8)	-0.3 \pm 1.2 (-2.8–1.7)

Table 2. Pre and post intervention score (mean \pm SD (min-max)) for physical and mental health as well as the differences between tests (mean difference \pm 2SD) for high intensity group, low intensity group and control group.

	High Intensity Training Group	Low Intensity Training Group	Control Group
Pre intervention			
Total physical health	48.6 \pm 9.9 (16–65)	45.3 \pm 9.5 (30–60)	43.05 \pm 8.2 (28–55)
Total mental health	49.6 \pm 12.5 (14–65)	53.1 \pm 8.7 (33–67)	48.68 \pm 9.65 (29–66)
Post intervention			
Total physical health	50.5 \pm 8.2 (20–64)	46.4 \pm 10.2 (27–62)	43.09 \pm 10.56 (23–59)
Difference (test 2- test 1)	1.9 \pm 16.9	1.1 \pm 12.5	0.05 \pm 14.66
Total mental health	53.5 \pm 9.6 (23–67)	52.7 \pm 11.6 (17–68)	50.18 \pm 13.79 (22–67)
Difference (test 2- test 1)	3.9 \pm 19	-0.3 \pm 23.4	1.5 \pm 25.67

PO2.111

Associations of shivering threshold with cardiorespiratory fitness, physical activity and body composition in young adults: Preliminary results of the ACTIBATE study

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Background: Brown adipose tissue (BAT) has emerged as a potential therapeutic target against obesity and associated comorbidities. BAT main function is maintaining body temperature through Non-Shivering Thermogenesis. Currently there is an open debate about the role of exercise on BAT physiology¹.

Objectives: To study the associations between shivering threshold, cardiorespiratory fitness, physical activity and body composition in young adults.

Material & Methods: A total of 28 young adults (22.07 \pm 2.04 years; 25.24 \pm 5.72 Kg/m²; 67.9% women) participated in the study. Shivering threshold was determined through an incremental cooling protocol where participants rested in a room (18.9 \pm 0.4°C) wearing a water-perfused vest, and water temperature was reduced every 10 minutes. Time to shivering was registered. Cardiorespiratory fitness was measured by a maximum effort test. Physical activity was assessed through accelerometry for 7 days. Body composition was determined by Dual Energy X-ray Absorptiometry.

Results: Partial correlations showed a significant inverse association between time to shivering and cardiorespiratory fitness ($r = -0.521$; $p = 0.013$). Marginal significance was found for the association between time to shivering and fat mass index ($r = 0.400$; $p = 0.065$). No association was found between time to shivering and lean mass index ($r = 0.324$; $p = 0.141$), sedentary time ($r = 0.140$; $p = 0.534$) or moderate-to-vigorous physical activity ($r = -0.253$; $p = 0.256$).

Conclusion: Shivering threshold seems to be lower in young adults with a higher cardiorespiratory fitness which concurs with a previous study² showing lower BAT activity in endurance trained subjects than in sedentary counterparts. This finding suggests an inhibitory effect of endurance exercise on BAT thermogenesis capacity. However, these results should be interpreted cautiously considering the small sample size and the study design. Exercise-based interventions studies are needed to determine the effect of exercise on BAT thermogenesis capacity in adults.

References:

1 Sanchez-Delgado et al. (2015) Ann Nutr Metab; 67(1):21–32.

2 Vosselman et al. (2015) Int J Obes 39(12):1696–1702.

Acknowledgements: Study funded by the Spanish Ministry of Economy and Competitiveness, FIS-Instituto de Salud Carlos III (PI13/01393), Fondos Estructurales de la Unión Europea (FEDER), by the Spanish Ministry of Science and Innovation (RYC-2010-05957), the Spanish Ministry of Education (FPU-13/04365), by RETIC (Red SAMID RD12/0026/0015), by the FINUT, and by AstraZeneca HealthCare Foundation.

PO2.112

The effect of exercise on appetite in subjects with the {FTO}-linked obesity-risk rs9939609 polymorphism

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Background & Aims: Polymorphisms within the fat mass and obesity-associated gene (FTO) associate with adiposity. Normal-weight subjects homozygous for the rs9939609 FTO-linked obesity-risk variant (A) display increased postprandial appetite and attenuated reduction in plasma acyl-ghrelin levels (Karra et al., 2013). Exercise acutely suppresses appetite and acylated ghrelin (Broom et al., 2007). We aimed to investigate the effects of exercise on appetite and circulating acyl-ghrelin levels in AA (high obesity-risk) compared to TT (low obesity-risk) subjects.

Material & Methods: Male TT and AA subjects participated in an exercise and control trial. During the exercise trial, participants ran for 60 minutes at 70% of maximal oxygen uptake and rested for 7 hours. Participants rested for 8 hours throughout the control trial. A test meal was consumed at 1.5 hours and an ad libitum buffet meal was provided at 6.5 hours. Appetite assessments and plasma samples were collected throughout.

Results: Post-meal appetite was greater in AA compared to TT subjects ($p < 0.05$, $n = 9$ per group). In both genotypes, exercise suppressed appetite ($p < 0.05$). Energy intake at the buffet meal tended to be greater in AAs (1249 \pm 159 v 916 \pm 108 kcal; $p < 0.08$), although there was no effect of exercise. There was no interaction of genotype and exercise. Hormonal data is expected within the coming months.

Conclusion: AA subjects exhibit greater appetite and energy intake compared to TT subjects. However, exercise acutely suppresses appetite in both genotypes without inducing compensatory increases in appetite and energy intake. These findings suggest that exercise may attenuate obesity-risk in AA subjects.

References:

Broom et al. 2007. Journal of Applied Physiology. 102: 2165–2171.

Karra et al. 2013. Journal of Clinical Investigation. 123: 3539–3551.

Acknowledgements: This research was supported by the National Institute for Health Research Diet, Lifestyle & Physical Activity Biomedical Research Unit based at University Hospitals of Leicester and Loughborough University and Rosetrees Trust. Footnotes The authors declare there are no conflicts of interest.

Rated hunger: Mean \pm SEM of rated hunger during the control and exercise trials in AAs ($n = 9$) and TTs ($n = 9$). Hatched rectangle, exercise run; solid rectangle, test meal; dotted rectangle, buffet meal.

Effects of active commuting and leisure time physical activity of different intensities on appetite and energy intake in overweight men and women

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Aerobic exercise is associated with disappointing weight loss outcomes which likely is explained by increased appetite and energy intake (EI). In an ongoing 6-months (mo) trial we examined effects of active commuting and leisure time physical activity (LTPA) on appetite and EI. Here we present a preliminary analysis after 3 mo. A total of 75 overweight and obese sedentary men and women were randomized to active commuting (BIKE, $n = 18$), LTPA of moderate (MOD, 50% $\text{VO}_{2\text{max}}$, $n = 25$) or vigorous intensity (VIG, 70% $\text{VO}_{2\text{max}}$, $n = 21$) (all 420 (M)/320 (F) kcal, 5 days/week) or control (CON, $n = 11$). At 0 and 3 mo. appetite ratings were obtained fasting and in response to a standard meal (180 min) and an exercise bout (60 min). Ad libitum EI was assessed 60 min after the exercise bout. Body weight decreased in BIKE and VIG (-1.5 ± 0.8 kg and -1.9 ± 0.5 kg, respectively; both $p < 0.05$). In response to the meal, hunger (AUC 0–180 min) and prospective food consumption (PFC) (AUC 90–180 min) increased (both $p < 0.05$) and a composite appetite score (AUC 120–180 min) decreased (i.e. increased appetite) ($p = 0.04$) in BIKE. In contrast, after the meal, hunger (AUC 90–180 min) and PFC (AUC 0–180 min) decreased (both $p < 0.05$) in VIG. Ad libitum EI increased in BIKE ($p = 0.02$). These preliminary results suggest that 3 mo. of vigorous intensity LTPA reduced post prandial appetite ratings whereas an opposite post prandial pattern was observed after active commuting. Funded by the University of Copenhagen Excellence Programme for Interdisciplinary Research and by TrygFonden

The impact of the childcare environment on physical activity and BMI in preschool children (SPLASHY)

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Background: Understanding environmental determinants in preschool years is primordial in tackling childhood obesity. The childcare (CC) environment can influence young children's physical activity (PA) behaviour and obesity.

Objectives: To examine the impact of the CC environment on PA and BMI in preschool children.

Materials & Method: 84 CC were invited to participate in a Swiss Preschool's Health study (Splashy). CC environment was evaluated through a modified Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) questionnaire (1). Based on the Ecological model of health behaviour proposed by Sallis et al. (2), 5 domains were used for selection and categorisation of 33 variables in addition to age and sex:

demographic/biological, psychological/cognitive/emotional, behavioural, socio-cultural, and physical environment. PA was measured using accelerometers which were worn at least 10 h/day over a week. Analyses were performed using total PA (TPA) and BMI Z-score (WHO criteria) as the main outcomes.

Results: 476 preschool children (mean age 3.9 ± 0.7 yrs; 251 boys and 225 girls, 18% overweight, 5% obese) participated in the study. Mean TPA was 621.5 ± 153.6 counts per minutes. Children attended CC for 2.9 ± 1.1 days/week. Using 5 different imputed datasets and multiple regression and penalized regression analyses, we identified the following significant robust predictors for TPA: age (positive), sex (negative), number of age classes within one CC group (demographic/biological; positive), and the less robust predictors were staff PA participation (behavioural, positive) and PA professionals intervening at CC (socio-cultural, positive). Respective robust predictors for BMI were: age (negative), sociocultural region (positive), and being excluded by peers in CC (psychological/cognitive/emotional, positive), and less robust predictors were vegetables served at CC (behavioural, negative), a "healthy nutrition" label at CC (socio-cultural, negative), nutritional staff education (socio-cultural, positive), and CC total surface area (physical environment, positive).

Conclusion: CC environment can influence overall PA and BMI, but the respective predictors differ.

Reference:

1 Ammerman et al. 2007 2. Sallis et al. 2000 Acknowledgment: Funded by the Swiss National Research Foundation and the Jacobs Foundation.

Gastric bypass reduces overall muscle strength while structured supervised physical training improves hip adduction

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Background and Aims: The objective of Roux-en-Y gastric bypass (RYGB) is the loss of fat mass. However, the post-surgery catabolic phase results in an undesirable loss of muscle mass which may impact the patients' health, functional ability, and capability to benefit from physical exercise programs. The purpose of this study was to evaluate the effect of RYGB on weight loss and muscle strength, additionally to evaluate the effect of physical training on the same variables.

Methods: Sixty patients qualified for RYGB were six months post-surgery randomized 1:1 to 26 weeks intervention or a control group. The intervention consisted of training sessions of aerobic capacity and muscle strength training (2 x 40 min/week) and was instructed and supervised by physiotherapists. Measurements of body weight and muscle strength were performed pre-surgery, six, and twelve months post-surgery. Muscle strength in shoulder adduction/abduction and hip adduction/abduction/extension was measured with a dynamometer.

Results: Baseline results are presented in Figure 1. RYGB resulted in reduced mean (SEM) body weight (Δ : -27.3 kg (0.9), $p < 0.001$) and a decrease in all muscle strength measures ranging from 7 to 11% (all $p < 0.001$) (Fig. 1). Physical training caused an additional significant reduction in BMI (Δ : -0.9 kg/m² (0.4), no further reduction in body weight, and significantly improved measures of muscle strength for hip adduction in the intervention group compared with the control group (Δ : 13.0 N (4.2), $p = 0.003$) (Table 1).

Conclusion: The overall reduced muscle strength during the initial phase of weight loss, induced by RYGB, emphasizes the need of post-surgery strength training. This study showed significant effects of physical train-

ing to sustain muscle strength in the hip adductors one year post-surgery. Further research in post-surgery strength training is needed to determine, how to prevent the overall loss of muscle strength. Two year post-surgery results will be conducted to assess potential long-term effects of supervised physical training. Funding The Research Council and Department of Endocrinology, Hospital of Southwest Denmark, Karola Jørgensens Fond, Region Syddanmark and Hedegaard-Jensens Fond

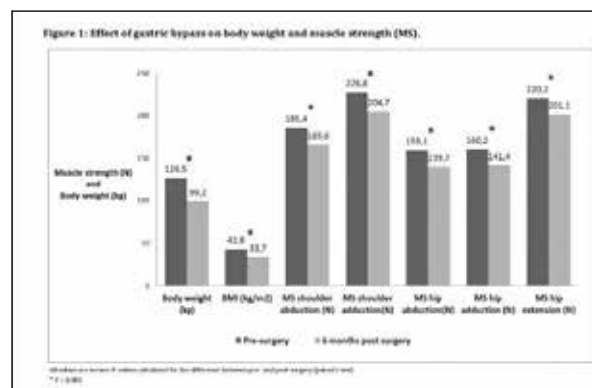


Fig. 1.

	Control N=28		Intervention N=32		*P-value Intervention vs Control
	Before	After	Before	After	
Body weight (kg)	98.5 (19.3)	92.9 (18.7)	99.8 (18.0)	91.7 (17.7)	0.088
BMI (kg/m ²)	34.1 (5.4)	32.1 (5.1)	33.3 (6.2)	30.6 (5.5)	0.049
MS shoulder abduction (N)	160.0 (55.1)	165.3 (64.8)	170.4 (42.3)	177.0 (57.5)	0.986
MS shoulder adduction (N)	196.9 (67.1)	193.9 (76.7)	211.4 (58.3)	222.3 (67.3)	0.153
MS hip abduction (N)	137.3 (37.4)	134.3 (38.6)	141.7 (36.6)	147.1 (34.2)	0.063
MS hip adduction (N)	137.1 (46.3)	132.9 (46.7)	145.1 (36.0)	153.6 (39.5)	0.003
MS hip extension (N)	198.7 (60.0)	197.2 (58.2)	203.2 (46.6)	199.1 (50.3)	0.738

Fig. 2.

PO2.118

Physical exercise alleviated ER stress in obese humans through reduction in the expression and release of GRP-78 chaperone

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Background/Objectives: Perturbation of the endoplasmic reticulum (ER) homeostasis has emerged as one of the prominent features of obesity and diabetes. It occurs when the adaptive unfolded protein response (UPR) fails to restore ER function in key metabolic tissues leading thus, to a persistent ER stress condition. Using a targeted transcriptomic profiling approach, the objectives of our investigation are: 1) to identify genes of the ER/UPR pathway showing differential expression between lean and obese human subjects and, 2) assess the effect of a supervised 3-months physical exercise protocol on their expression pattern in relationship with the of the physical, clinical and biochemical outcomes.

Methods: Adipose tissue and blood samples were collected from adult human subjects at baseline and after 3 months of physical exercise. Transcriptomic profiling was used as a primary screen to identify differentially

expressed genes and it was carried out on adipose tissue samples using the UPR RT2 Profiler PCR Array. Conventional RT-PCR, immunohistochemistry, immunofluorescence, western blot and ELISA were subsequently used to validate the transcriptomic data. Correlation analyses were performed using Spearman's rank correlation coefficient.

Results: Levels of GRP-78 and its 3 downstream UPR arms; Activating transcription factor 6 (ATF6), inositol-requiring enzyme 1α (IRE1α) and protein kinase RNA-like endoplasmic reticulum kinase (PERK) are increased in obese subjects. More interestingly, higher levels of circulating GRP78 protein were found in obese compared to lean subjects and they correlated negatively with maximum oxygen uptake (VO₂Max) but positively with high-sensitivity C-reactive protein (hsCRP) and the obesity indicators such as BMI, percentage body fat (PBF) and waist circumference. GRP78-increased secretion in obese was further confirmed in vitro using 3T3-L1 preadipocyte cells under ER stress. We finally show that physical exercise attenuated significantly the expression and release of GRP78 with a concomitant reduction in the activity of IRE1α and eukaryotic initiation factor 2 alpha (eIF2α).

Conclusions: Our results suggest that physical exercise alleviated ER stress in human obese through attenuation of GRP-78 signaling network.

PO2.119

One year assessment of physical activity behavior in adult Qatari females: A longitudinal study

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Background: Physical inactivity is a growing health concern and has been identified as the fourth leading risk factor for global mortality. Arab region involves countries with some of the world's highest physical inactivity levels, such as Qatar, more specifically Qatari female population. Physical inactivity is associated with the global lifestyle transformations, characterized by reduced physical activity and unhealthy diet. However, walking is the most common form of physical activity which can promote healthy well-being among people of different age groups.

Purpose: The aim of this study is to assess the physical activity level and behavior of Qatari national adult females during a one-year period.

Method: This longitudinal study was conducted to evaluate the current situation of Qatari females' physical activity behavior based on their step counts from April 2014 – March 2015. A total of 549 Qatari national females aged between 18–64 years-old were included. Data extracted from "Step into Health" program web-database in Qatar (a community-based program launched in 2012 as an approach to improve physical activity) was used for analyses. Daily habitual physical activity (daily total step count and aerobic steps) was assessed through Omron HJ-324U pedometer.

Results: This study shows that the mean age was 37.4 ± 11.7 years and Body Mass Index (BMI) results show an average of 29.6 ± 7.9 kg/m². Daily steps for the overall population ranged from 3,505 to 10,010 steps/ day, with a median of 6,008 steps/ day. A total of 44.1% females were sedentary, 32.4% were low active, and 23.5% were physically active. The physically active group show a median of 927 steps/ day (IQR 0 to 4,248). In addition, those of age 40 and below were found to be more active. However, the overall population was found to be less active during weekends and summer season.

Conclusion: Based on the results of this study, Qatari females are classified as sedentary and obese. It is essential to further develop the available intervention programs specifically tailored to Qatari national adult females and increase their physical activity behavior. Planning such physical activity interventions for female population should involve aspects such as time, environmental variables and aerobic steps.

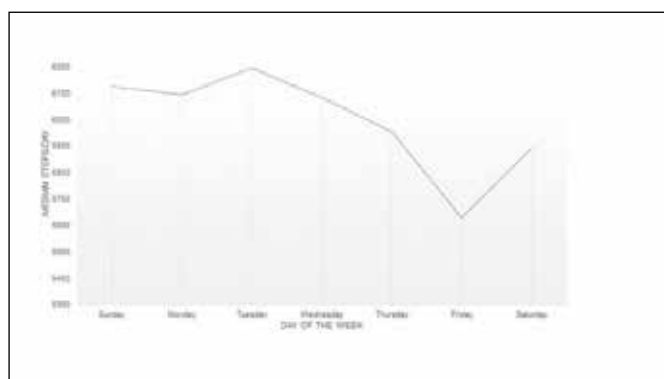


Fig. 1. Step-count median variations per weekdays.

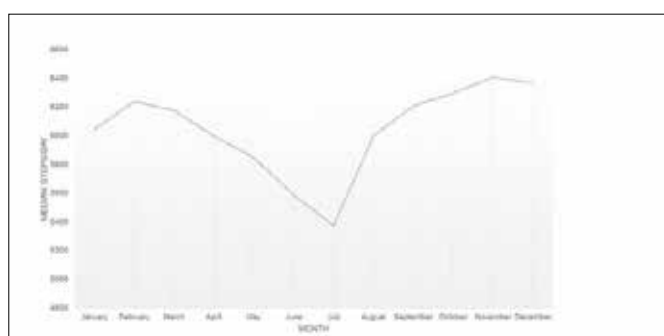


Fig. 2. Step-count median variations over a twelve-month period.

Tab. 1. Characteristics of the overall study population (N = 549)
Abbreviations: SD, standard deviation; BMI, body mass index.

	Mean \pm SD
Age (years)	37.4 \pm 11.7
Height (cm)	159.0 \pm 9.5
Weight (kg)	75.4 \pm 20.0
Weight (kg)	29.6 \pm 7.9

Tab. 2. Classification of the study population based on their physical activity level
Notes: Values are expressed as count (%), mean \pm SD, or median (interquartile range [IQR]). Values in bold are statistically significant at $p \leq 0.05$. Abbreviations: SD, standard deviation; BMI, body mass index.

	Overall Population	Sedentary <5,000 steps/day	Low Active 5,000–7,499 steps/day	Physically Active $\geq 7,500$ steps/day	P
Total	549 (100)	242 (44.1)	178 (32.4)	129 (23.5)	
Age (years)	37.4 \pm 11.7	35.5 \pm 11.3	37.1 \pm 11.8	41.2 \pm 11.1	<0.001
Age groups					0.001
≤ 40	327 (59.6)	163 (49.8)	106 (32.4)	58 (17.8)	
41–50	135 (24.6)	49 (36.0)	43 (32.0)	43 (32.0)	
>50	87 (15.8)	30 (34.5)	29 (33.3)	28 (32.2)	
BMI	29.6 \pm 7.9	29.3 \pm 7.4	29.8 \pm 7.8	29.7 \pm 8.9	0.775
Daily step count	6,008 (3,505–10,010)	3,342 (2,222–4,935)	5,655 (3,814–7,977)	10,150 (7,100–13,009)	<0.001
Aerobic steps	0 (0–1,500)	0 (0–0)	0 (0–0)	927 (0–4,248)	<0.001

PO2.120

Physical activity and cardiorespiratory fitness are associated with thigh skeletal muscle and adipose tissue in overweight and obese women

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Background & Aims: High intermuscular AT (TIAT) is strongly associated with reduced insulin sensitivity in obesity, while thigh subcutaneous AT (TSAT) has been associated with favorable metabolic risk factors (when waist circumference is taken into account). Physical activity (PA), sedentary behavior (SB), and cardiorespiratory fitness (CRF) seem to influence thigh composition.

Objective: To analyze the associations between objectively measured PA, SB, and CRF with total thigh skeletal muscle mass (TSMM), TIAT, and TSAT.

Material/Methods: This cross-sectional study involved 98 overweight and obese premenopausal women (38.2 ± 5.5 y; 30.1 ± 3.0 kg/m²). Thigh AT and TSMM were determined by CT. Daily PA and SB were assessed by accelerometry, and CRF was estimated by respiratory gas exchange using a maximum incremental exercise test. A Z-score for thigh composition was computed using TSMM, thigh skeletal muscle attenuation coefficients (HU), TSAT, and TIAT. Multiple regressions were used to assess the relationship between PA, SB, and CRF and the computed Z-score. ANOVA was used to compare Z-score at PA, SB, and CRF tertiles.

Results: CRF predicted TSMM ($\beta=0.09$; $P=0.001$) adjusted for BMI. Daily time in light PA was negatively associated with TSAT even when CRF was included in the model ($\beta=-0.03$; $P=0.041$). The negative association between light PA and TIAT ($\beta=-0.003$; $P=0.040$), along with the positive association between daily minutes in SB and TIAT ($\beta=0.003$; $P=0.031$), became both marginally non-significant after controlling for CRF ($\beta=-0.003$; $P=0.061$ and $\beta=0.003$; $P=0.052$, respectively). The mean Z-score of thigh SM composition revealed a graded increase across tertiles of CRF, with significant differences between the first and the third tertiles ($P=0.026$). A graded non-significant increasing trend was observed in

the Z-score between total PA tertiles ($P > 0.05$), while similar Z-scores were verified for daily SB tertiles ($P > 0.05$).

Conclusion: In overweight and obese premenopausal women, CRF is positively associated with TSM. Light PA appears to decrease thigh AT, while SB seems to increase it. The improvement of thigh morphology via increased CRF and PA, and decreased SB, should be considered in weight control interventions.

PO2.121

Aspects of exercise before or after bariatric surgery: A systematic review

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Background: Bariatric surgery has a considerable effect on weight loss. A positive relation of exercise and weight loss has been described before. **Objectives:** To systematically review the mode of exercise and its timing pre- or postoperative or a combination in the bariatric surgical population.

Materials & Methods: A multi database search was conducted. Identified articles were reviewed on description of exercise, timing around a bariatric intervention and outcome. Methodological quality of the included studies was rated using the Physiotherapy Evidence Database scale. A Cohen's kappa score assessed the level of agreement. Outcome measurements were improvement of anthropometric and physical fitness variables, operation related complications, weight regain and quality of life.

Results: A total of eight prospective studies were included. Four focussed on training before and four on training after a bariatric procedure. Details of exercises varied from 45 minutes treadmill up to full descriptive programs. Supervision was frequently included. Significant improvement was encountered for biometric results physical fitness variables.

Conclusion: In the majority of reports on exercising in a (future) bariatric population, a positive effect on anthropometrics, cardiovascular risk factors and physical fitness was described. However, the results were not unanimous, with a wide range of exercise programs and peri-operative timing and therefore hampering adequate practical guidance.

PO2.122

Selenium supplementation and modified high-intensity interval training (m-HIIT) to modulate cardiovascular disease risk in sedentary overweight/obese adults: In vitro and in vivo studies

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Background & Aims: Obesity is characterised by systemic oxidative stress (OS) resulting from chronically high levels of reactive oxidative species (ROS) and reduced antioxidant capacity. OS plays a fundamental role in cardiovascular disease (CVD) development by initiating atherosclerotic plaque formation (1). Increased dietary antioxidant intake or up-regulation of endogenous antioxidant enzymes may counteract OS and lower CVD risk. Both supplementation, with the essential micronutrient selenium, and participation of regular physical activity (PA) increase the activity of the endogenous antioxidant enzyme Glutathione Peroxidases (GPx)(2). However, it is unknown whether modified high-intensity interval training (m-HIIT), an emerging time-efficient exercise regime, modulates the redox status and CVD risk among sedentary overweight/obese adults. Furthermore, it is unknown whether combined exercise training and selenium supplementation induce an additive improvement in GPx

activity. This work investigates the effect of selenium supplementation on GPx gene expression and ROS generation in vitro, and assesses the role of a dietary and exercise intervention in modulating markers of CVD risk in vivo.

Methods: Monocyte cells were cultured with/out sodium selenite (Na_2SeO_3 ; 100nM) for 48h and subsequently stimulated with Paraquat (1mM) (PQ) and S-Nitroso-N-acetyl-DL-penicillamine (0.7mM) (SNAP) for 16h, to induce OS. GPx-1/GPx-4 gene expression was quantified by semi-quantitative RT-PCR while ROS generation determined by CM-H2DC-FDA flow-cytometry. A three-armed randomised intervention study, 8 weeks m-HIIT (10x1min at 60% peak aerobic power, three days/week) and/or selenium supplementation (100ug selenomethionine/day), is on-going.

Results: PQ/SNAP treatment significantly increased ROS generation compared to untreated control cells; confirming OS induction. Furthermore, selenium supplementation significantly increased GPx-1 (146%) and GPx-4 gene expression (77%) when compared to un-supplemented stressed cells. Our pilot study found a single m-HIIT bout to significantly increase plasma GPx activity 15 minutes post-exercise; whereas preliminary results from the combined intervention study have shown m-HIIT significantly improves cardiorespiratory fitness.

Conclusions: Selenium supplementation and m-HIIT may, therefore, be effective in counteracting OS by significantly increasing GPx expression in an in vitro and in vivo system. “

References:

1 Vendrov et al. (2007) *Arterioscler Thromb Vasc Biol* 27, 2714–2721;

2 Criswell et al. (1993). *Med Sci Sports Exerc.* 25 (10): 1135–1140.”

Acknowledgement: Robert Gordon University for studentship to DL.

PO2.123

Recommendation provided by health professional to person with type 2 diabetes regarding physical activity in west Africa

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Objectives: To assess the recommendations provided by health professionals to persons with diabetes regarding physical activity.

Methodology: The cross-sectional study was conducted over three months in 2012 in Ouagadougou (Burkina Faso) and Bamako (Mali). Interviews with closed and open-ended questions were conducted with a total of 78 health professionals (including 60 MDs) involved in the treatment of persons with diabetes in public hospitals and health centers.

Results: 77% of health professionals interviewed were physicians For physical activity 95% of the health professionals had a satisfactory recommendation and the factors associated were the country, the occupied station and the received formation. The different physical activity recommended by the health professional was walk, bicycle, house work and jogging. Indeed, the doctors recognize the difficulties related to the practice of sport in the African cities. About the physical activity, for the totality of the health professional, the answer most shared by all and stated is “In the African context, the practice of the sport in the city is almost non-existent. Even the Town hall does not take into account space for the sport. Thus one asks the patients to do themselves, the households, the detergent, to walk to go to work. It is really all that one can do”

Conclusion: The study highlights the need to improve dietary counseling of patients with diabetes, particularly as regards developing specific dietary plans with individual patients for better compliance. Health professionals specialized in nutrition are becoming a priority in Africa to address nutrition-related non-communicable diseases, to train other health professionals and to assist individual patients.

The Role Of Anthropometric Variables In Relation To The Risk Of Breast Cancer In Pre-Menopausal Women Living In Cape Coast, Ghana

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In Ghana, breast cancer is the leading malignancy, which accounts for 15.4% of all malignancies and reports show an increase from 11.8% to 20.4% from 1974 to 1991. Though positive associations have been observed between high BMI, WHR and risk of breast cancer among post-menopausal women, there are conflicting results for premenopausal women. This study is aimed at linking these anthropometric indices of pre- and post-menopausal women to breast cancer risk, in order to examine the correlation if any between these indices and breast cancer risk in both pre and postmenopausal women. A prospective cross sectional study based on simple random sampling involving 207 women was carried out from November 2013 to January 2014 in Cape Coast. Weight, height, body fat, visceral fat, muscle composition and resting metabolic rate and waist and hip measurements were taken and BMI computed. Breasts were examined by the use of BreastLight for any sign of lumps and abnormality and suspicious cases referred to the Surgery Department for further examination. The age range of the study was 20 – 60 years with 132 (63.7%) premenopausal women. The mean menarche age, body fat and BMI for pre- and post-menopausal women were 13.9 and 14.7; 38.1 and 41.9; 27.3 and 29.8 respectively. Twenty six (12.6%) of the participants had suspicious lumps with 21(80.8%) being premenopausal. Among the premenopausal women with lumps 19.1% were obese, 28.6 were overweight and 47.6 normal. For premenopausal women with lumps 86.5% had high body fat percentage (>34). Our results on BMI indicated that women who were overweight or obese during premenopausal ages were at lower risk of breast cancer however, women who were overweight or obese during postmenopausal period were significantly at higher risk of breast cancer. The results provide further evidence that age at menarche as breast cancer risk was significantly associated with postmenopausal women compared to premenopausal women. The study was able to provide strong support for a positive association between body fat, visceral fat and breast cancer risk in pre and postmenopausal obese women. The results provide further evidence that the risk of breast cancer increases with reproductive factors.

Research gaps in physical activity, sedentary behavior, and obesity among children in Qatar: A systematic review

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Introduction: The prevalence of childhood obesity is escalating worldwide due to increased physical inactivity and sedentary behavior. Childhood obesity is known to be an independent risk factor for obesity in adulthood. Children are considered vulnerable since they go through critical stages of developmental growth and need special attention. In the State of Qatar, physical activity, sedentary behavior, and obesity represent only the tip of the iceberg phenomena due to the lack of information which might not reflect the current situation in the country.

Objectives: The aim of this study was to carry out a systematic review of published studies and identify gaps related to physical activity, sedentary behavior, and obesity among children in Qatar.

Methods: A search strategy was developed for electronic databases (PubMed and other local resources) for the available data in Qatar between the year 2003 and 2013. The keywords used for search were physical activity, sedentary behavior, and obesity. Studies found were reviewed and selected based on an inclusion criteria which involves children (age 5–11 years) and youth (age 12–17 years).

Results: A total of 5 relevant publications were identified to meet our selection criteria with a total of 16,457 subjects. Only 10–15% of children, aged 13–15 years old, were found to be physically active with at least 60 minutes daily for five days per week. Around 27% of children, aged 13–15 years old, met the National Physical Activity Guidelines for Qatar (NPAG-Q) for school age children. Only 19% children of age 6–12 years old were obese, 24% of them boys and 17% girls. Whereas, 25% of youth (age 11–18 years old) were found obese, 28% boys and 21% girls.

Conclusion: There is insufficient evidence of physical activity, sedentary, and obesity-related research which might not reflect the current situation in Qatar. Thus, the information obtain by this study cannot be generalized. There is a need to establish a national surveillance system and increase research magnitude and quality to track patterns related to physical activity, sedentary behavior, and obesity in Qatar.

Physical activity of adolescents with obesity

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Background & Aims: Childhood obesity is one of the most serious public health challenges of the 21st century. The prevalence has increased at an alarming rate. Overweight and obese children are likely to stay obese into adulthood and more likely to develop noncommunicable diseases like diabetes and cardiovascular diseases at a younger age. Overweight and obesity, as well as their related diseases, are largely preventable. Prevention of childhood obesity therefore needs high priority. According to WHO, 81% of adolescents aged 11–17 were not physically active in 2010. Adolescent girls were less active than teenage boys, with 84% against 78% not meet the WHO recommendations.

Objectives. To investigate the physical activity of adolescents with obesity in St. Petersburg.

Material & Methods. We analyzed physical activity of adolescents with obesity in St. Petersburg. The study included 40 adolescents (20 boys and 20 girls). The mean age was 13.33 years. Estimation of the length, weight and BMI according to WHO criteria was conducted for all children. 15% of girls and 5% of boys had overweight, other – obesity. Physical activity has been studied according to the questionnaire «The International Physical Activity Questionnaires (IPAQ)».

Results. Walking more than 60 minutes per day have no more than half of children (53%) of obesity. Only 28% of children have low physical activity regularly (usually 5 times a week). 30% of girls and 10% of boys had intense exercise during the last week. 33% of children do not have the intense exercise longer than 10 minutes. Overall, 80% of boys and 55% of girls are obese have a sufficient level of physical activity. Factors contributing to obesity in these children should be identified.

Conclusion. Low physical activity was revealed only 33% of respondents and its role in forming of obesity in these children requires the study later.

Comparison of Different Methods: Used in Evaluation of Physical Activity

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Objectives: This study was carried out in order to compare the different methods for evaluation of physical activity and determination of physical activity level on young adults.

Material/Methods: This is a cross-sectional study which is conducted with 365 young adults and adult females. The general information of people is recorded with face to face interview. Physical activity level was evaluated by using 24-hours activity record, step count and IPAQ. The data was analysed with using SPSS 20.0 program.

Results: The mean age of individuals was 20.5 ± 1.75 years (min-max 17–26 years). According to BMI classification 13.2% of total were found underweight, 77.5% normal, 9.3% overweight. Daily energy expenditure was found higher in underweight than overweight also mean difference was 334.5 kcal (F: 14.734, $p < 0.05$). When physical activity was evaluated according to PAL, 33.7% of participants was inactive 54.5% sedentary, 13.2% average and 1.6% high activity level. According to IPAQ evaluation 24.4% of participants was inactive, 62.7% light active, 13.9% high active. According to classification of PAL mean step numbers was 8655.9 ± 4313.03 step in inactive group, in middle active group was 10643.1 ± 4124.37 step, in high activity group was 10697.7 ± 890.89 step ($p > 0.05$). Positive correlation was found between measured by IPAQ activity (MET/min/week) and PAL ($r: 0.322, p < 0.05$) and the number of steps measured by pedometer.

Conclusion: Methods: were used to evaluate the physical activity level is consistent. Many of the participants is determined sedentary. The average number of steps measured by the pedometer is the lowest in inactive subjects. It was determined as the average of 10,000 steps or more for other groups. Young adults should be encouraged for increase of physical activity in order to reduce morbidity, mortality and health protection

Prevention of obesity – should we target those most susceptible?

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Background: Most of the multiple randomized, controlled intervention studies conducted among children and adolescents during the past 20–30 years have not provided evidence on how to prevent obesity. One explanation for the lack of success may be that intervention effects are in part restricted to individuals that are susceptible to develop obesity, and that such effects may be diluted when general populations are targeted. **Objective:** To review results from obesity interventions to examine if studies targeting obesity susceptible groups or individuals seem more successful in preventing obesity than studies targeting general population groups

Material/Methods: A literature search for papers published during September 1st 2010 and February 15th 2015 on obesity prevention interventions was performed in Pubmed. Studies were reviewed for targeting of universally selected or obesity susceptible groups, intervention effect in relation to anthropometric measurements, and definition of obesity susceptibility (if any).

Results: In total, 79 papers were identified and included, of which 15 papers were originally included in a review published in 2012. A total of 51 papers reported on studies targeting universally selected groups, of which 41% of the studies reported an effect of the intervention. A total of 28 papers reported on studies targeting obesity susceptible groups, of which 68% of the studies reported an effect of the intervention. In the studies targeting obesity prone groups, susceptibility was primarily defined based on socioeconomic status or ethnicity.

Conclusion: Targeting obesity susceptible groups seem more effective in preventing obesity than targeting universally selected groups. However, few interventions have hitherto been conducted in groups that are susceptible to develop obesity because of risk factors alternate to socioeconomic status and ethnicity.

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Reliability and validity of the Norwegian version of Impact of Weight on Quality of Life questionnaire

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Background & Aims: The Impact of Weight on Quality of Life-Lite (IWQOL-Lite) questionnaire is widely used and linguistically validated for use in many countries[1]. However, it has not yet been validated on a Norwegian sample.

Objectives: To test reliability and validity of the IWQOL-Lite in a Norwegian sample.

Material & Methods: One group of patients (n = 114) completed the IWQOL-Lite prior to sleeve gastrectomy, and another (n = 111) one year postoperatively. We report Cronbach's α , Pearson's correlations and standardized mean differences using paired sample t-tests. “(

Results: We included 225 patients (69.3% women). The mean age was 42.5 ± 11.0 years, and mean BMI was 36.4 ± 7.6 . Cronbach's α of the five IWQOL-Lite subscales ranged from 0.90 for sexual life to 0.96 for physical function, and was 0.96 for the total score. All the IWQOL-Lite scales correlated significantly with the SF-36 physical component score (PCS), SF-36 mental component score (MCS) and BMI ($p < 0.001$). Correlations between the IWQOL-Lite and PCS ranged from 0.50 for sexual life to 0.82 for physical function, and was 0.77 for the total score. Correlation between the IWQOL-Lite and MCS ranged from 0.50 for sexual life to 0.64 for self-esteem, and was 0.64 for the total score. Correlation between IWQOL-Lite and BMI ranged from 0.43 for sexual life to 0.75 for physical function, and was 0.69 for the total score. All IWQOL-Lite subscales and total score were higher (i.e. better quality of life) in the operated group versus the baseline group ($p < 0.001$). The standardized mean IWQOL-Lite difference between the non-operated group and the operated group ranged from 1.0 standard deviations (SD) for sexual life to 1.7 SD for physical function and was 1.5 SD for the total score.

Conclusion: The Norwegian version of the IWQOL-Lite questionnaire appears to be a reliable and valid instrument for measuring obesity-specific quality of life.

Reference:

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Effective implementation of the EPODE/JOGG community-based approach to prevent childhood obesity

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Objectives: Perhaps the largest programme for community-based childhood overweight prevention is the EPODE International Network. EPODE is an acronym for 'Together we prevent childhood obesity'. Our city of Zwolle is the first EPODE-city in the Netherlands, targeting children aged 4–13 years, with a special emphasis on two neighborhoods with the highest prevalence rates of childhood overweight, our 'attention neighborhoods'. Our purpose here is to discuss the 3-years evaluation, including an evaluation on childhood overweight rates, behavior and a process evaluation.

Methods: In The Netherlands, EPODE is transformed into the JOGG-approach (acronym for youth at a healthy weight). Solid elements of the JOGG-approach are political support, public-private partnerships, social-marketing, research, and, in addition to the EPODE-approach, the linking between prevention and care. More than 5,000 children have been measured (body weight and height) from >80% of the primary schools in Zwolle and parents have filled in a questionnaire on energy-balance related behavior and environmental determinants of behavior. Further, several focus groups and interviews have been performed on several stakeholders have been performed to study process measures.

Results: Whereas childhood overweight increased between 2006 and 2009, the prevalence of childhood overweight prevalence decreased from 13.8% in 2009 to 12.0% in 2012. Interestingly, rates of childhood overweight also decreased in the two 'attention neighborhoods'. Effects on fruits and vegetable consumption were reported but, they were less pronounced than improvements in activity levels. Participating stakeholders, in general, provided feedback to us that they had been impressed by the combination of efforts and professionals have improved professional skills in prevention. The majority of stakeholders experienced a need and desire for a sustained approach.

Conclusions: Although we need to be careful in concluding that the EPODE-approach is successful in our town, since the evaluation period is relatively short, 3 years, and we measured overweight rates at two time-points only, the feedback we received on the large potentials to implement the approach in sustained manner, make us conclude that it is possible to adapt the EPODE-approach with showing success, and leading to a call for a sustained approach.

How do parents of 5-year-old children perceive the weight of their children?

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Introduction The prevalence of overweight in children is rising. Already 13% of Dutch children deal with overweight and obesity. Overweight is a risk factor for diseases in adulthood. To prevent and treat overweight, it's important that parents recognize the weight status of their children. We studied how parents perceive the weight of their overweight children. **Method** Parents of 2845 5-year-old children received a questionnaire and were asked to score on a 5-point scale, their perception on their child's weight, ranging from 'too light' to 'too heavy'. Children's height and weight were measured during their routine visit at the youth healthcare clinics. Parents and siblings' height and weight were self-reported. Socioeconomic status (SES) was scored based on living area.

Results: In total, 2203 (77.4%) children were included in the analysis (50.3% boys, mean age 5.8 ± 0.35 years, BMI 16.0 ± 3.3 kg/m²), and

14.5% of children where overweight of which 3.3% had obesity. In 70% of children, parents correctly perceived their child's weight status. Of all misclassification, 28% concerned underestimation of actual weight. However, underestimation of weight in overweight and obese children was much larger: 82%. Parents from families with more than 50% overweight members, including parents and siblings, perceived their overweight and obese children just as well as parents from families with less than 50% overweight members (20%), despite a higher prevalence of overweight and obesity in their children (56.5 vs. 9.5% respectively). With regard to SES, the prevalence of overweight and obesity in children decreased with increasing SES, from 15.9% in low to 15.1% in moderate to 11.2% in high SES. In contrast, correct perception of overweight and obesity in children increased from 16% in low, 17% in moderate to 32% in high SES.

Conclusion: Parents are unlikely to adequately perceive overweight in their children. Perception of overweight and obesity in children concerns underestimation in 80%. Parents with high SES perceive their overweight child better, but perception does not depend on the degree of overweight within families.

Effects of Glycemic index on the expression of selected miRNAs in adipose tissue: The GLYNDIET study

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Introduction Dietary glycemic index has been related to several chronic conditions, including insulin resistance. However, the mechanisms beyond this relationship have not been clarified yet. MicroRNAs have emerged as gene expression regulators of essential biological and metabolic processes that can be regulated by diet. **Aims** In the context of the GLYNDIET study, we aimed to understand whether a low-glycemic index diet (LGI) could affect the adipose tissue expression of specific miRNAs related to obesity, inflammation and insulin resistance compared to a high-glycemic index diet (HGI) and a low-fat diet (LF). **Method** A 6-month randomized, parallel, feeding clinical trial was conducted in 122 overweight and obese subjects. Participants were randomly assigned to one of the following energy-restricted diets: a moderate-carbohydrate and low-GI diet (LGI), a moderate-carbohydrate and high-GI diet (HGI), and a low-fat high-GI diet (LF). Subcutaneous fat samples from 50 subjects were collected at baseline and at the end of intervention and miRNA's expression was measured by RT-PCR.

Results: We did not observed changes in the expression of the studied miRNAs according to the diet intervention. We found significant changes according to weight loss between the beginning and the end of the intervention, mostly in the HGI group that showed a significant decrease in Body Mass Index (BMI) compared to the other groups. In particular, at the end of LGI intervention, we observed a significant decrease in the expression of miR-1179, miR-132, miR-221 and miR-378; after HGI intervention we observed decreased expression of miR-1179, miR-132, miR-221, miR-29a, miR-34a and miR-378; the group following a LF diet showed a decreased expression of miR-1179, mi-132, miR-221, miR-29a and miR-378.

Conclusion: Weight loss changes the expression of the 7 selected miRNAs more than the quality of the diet intervention.

Validity of self-measured waist circumference in the participants of the Dietary, Lifestyle and Genetic determinants of Obesity and Metabolic syndrome (DILGOM) Study

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The validity of self-reported height and weight measures has been widely established, but the validity of self-reported waist circumference (WC) is more rarely reported. This study aimed to validate self-measured WC against nurse-measured WC in the DILGOM study. At the baseline study in 2007, a population-based sample of adults aged 25–75 years from 5 large geographical regions in Finland was drawn (n = 5024). The follow-up study in 2014 (n = 3772) the invited from the capital metropolitan and Southwestern Finland to a health examination (Group 1; n = 1314) while participants living in the other 3 regions (Group 2; n = 2458) attended to a postal survey, which included a measuring tape and written instructions along with a health questionnaire. Within Group 1, a random subset (n = 400) was drawn, based on participants' age, sex, BMI, and educational attainment. Eventually, 140 men and 141 women measured their WC at the study site according to the same written instructions that were mailed to Group 2. Afterwards, a study nurse repeated the measurement. Pearson correlation coefficient between self- and nurse-measured WC was 0.97 in men and 0.96 in women (P < 0.001). When WC values were divided to those with normal or large WC (cut-off >102 cm for men and > 88 cm for women) 94% of men and 92% of women were categorized in the same WC class based on the measurer. However, Bland-Altman analysis revealed a negative bias toward higher WC values: The participants with larger WC reported more frequently lower WC values compared those measured by the nurse (P < 0.001). Furthermore, the difference between self- and nurse-measured WC was associated with age (beta 0.068 cm, P < 0.01) and with belonging to the middle versus lowest educational group (beta -2.884 cm; P < 0.01) in men. The results indicate that self-measured WC has high agreement with nurse-measured values in DILGOM study participants, which implicates that self- and nurse measured WC values may be used simultaneously in analysis. Due to negative bias toward higher WC values, sensitivity test that includes only participants with nurse-measured WC should be conducted to confirm results in further studies.

The risk of epithelial ovarian cancer in obesity before and after marked weight loss obtained by bariatric surgery

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Background: epithelial ovarian cancer (EOC) is a tumor associated to a high mortality. Obesity has been shown to be an established risk factor for EOC. The current biomarker for ovarian cancer is CA-125. Recently, Human Epididymis Protein 4 (HE4) has been proposed as a biomarker in EOC differential diagnosis. An algorithm (ROMA, Risk Of Malignancy Algorithm) has been developed for pre-menopausal and post-menopausal women to combine the diagnostic power of plasma CA125 and HE4 to predict the EOC risk. Aims: to evaluate whether obesity could represent a risk factor for EOC and could increase the ROMA index and if this risk could decrease after marked weight loss by bariatric surgery.

Patients and Methods: 163 obese women with body mass index (BMI) 42.4 ± 10.8 kg/m² age 33 ± 15.9 years (Group 1), and 130 normal weight women with BMI 22.8 ± 3.6 kg/m², age 30 ± 4.6 (Group 2) underwent CA-125 and HE4 plasma determinations that have been incorporated in ROMA algorithm. Patients of Group 1 underwent Sleeve Gastrectomy

(SG) and evaluated 1 year after surgery. We selected a population of premenopausal women to exclude menopausal status as a confounding factor.

Results: HE4 levels above the normal range were detected in 8.6% (14/163) of Group 1. and only in 3% (4/130) of Group 2 (p < 0.007). CA125 plasma concentrations above the normal range were observed in 2.5% (4/163) of Group 1 and in 6.1% (8/130) of Group 2 (p < 0.004). ROMA score above the cut-off (>13%) was detected in 24.5% (40/163) of Group 1, whereas in the normal-weight women group a high ROMA score was identified only in 5.3% (7/130) (p < 0.009). After SG and decrease of BMI (from 42.4 to 32.5 kg/m², p 0.001), we observed a decrease of ROMA score from 17.8 ± 2.6 to 14.1 ± 3.6 (p < 0.05) and it was in the normal range in 62% of the high risk for EOC obese women.

Conclusions: our data suggest that obesity in premenopausal women is a risk factor for EOC. It seems to have enough evidence to speculate the possible function of ROMA score as a simple, non-invasive test able to screen obese women at risk of developing EOC. This risk decreased after SG.

Fruit and vegetable consumption and blood pressure development: A longitudinal analysis from the LabMed Study

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Background & Aims: There is growing evidence about the beneficial effects of fruit and vegetable consumption and the reduction of Blood Pressure (BP) in adults (Appel et al., 1997; John, Ziebland, Yudkin, Roe, & Neil, 2002), however the independent effect of fruit and vegetables consumption in normotensive adolescents remains scarce.

Objectives: To analyse the influence of fruit and vegetable intake on BP in healthy adolescents.

Material/Methods: 789 adolescents (52.5% males), aged 12 to-18 years, from the LabMed study (2011- 2014) for whom at least three repeated measure of BP had been taken participated in this study. BP was measured using a Dynamap vital signs monitors (model BP 8800, Critikon, Inc., Tampa, Florida) after a rest for at least 5 min. Dietary intake was measured with a self-administered semi-quantitative food frequency questionnaire, which included foods more frequently eaten by this age group (Silva, Rego, & Guerra, 2004). The family affluence scale, anthropometry and cardiorespiratory fitness were gathered. The weight status was defined according to the International Obesity Task Force criteria (Cole, Bellizzi, Flegal, & Dietz, 2000). Participants self-assessed their pubertal stage according to the criteria of Tanner and Whitehouse (1976).

Results: Over a 2 year period fruit consumption decreased from a median (P25-P75) of 223.2g/d (132.3–380.1 g/d) to 193.1 g/d (106.4–331.1 g/d), systolic BP and diastolic BP decreased, on average, from 119.7 mmHg (13.6 mmHg) to 118.0 mmHg (12.4 mmHg) and from 63.9 mmHg (8.0 mmHg) to 60.5 mmHg (8.4 mmHg), respectively. Regression analysis showed that in pre-pubertal adolescents, the increase in whole fruit consumption was positively associated with reductions in diastolic BP over a two year period (β=-0.017 and 95%CI -0.032; -0.002), after adjustments for total energy intake, height, age, sex, potassium, sodium, family affluence scale, cardiorespiratory fitness, weight status and baseline measure of the dependent variable. No association was found for systolic BP.

Conclusion: In healthy adolescents, the consumption of whole fruit may influence diastolic BP. Intervention programs aimed at limiting the increase in BP, should include healthy eating habits such as fresh fruit with

an important impact on public health and in primary prevention of hypertension.

PO2.138

Blood pressure to height ratio in evaluation of pediatric hypertension

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Introduction: Recently, blood pressure to height ratio (BPHtR) index has been proposed as an alternative, age- and sex-independent measure of prehypertension (PHT) and hypertension (HT) in children and adolescents. However, the systolic BPHtR (SHtR) and the diastolic BPHtR (DHtR) percentiles distribution, both for girls and boys have not been analyzed yet and the thresholds for the new proposed indexes should be verified for a wider spectrum of study. Aims: To analyze the BPHtR indexes in schoolchildren from Poland including their age- and sex- specific percentile distribution. Subjects/Methods: A total of 25,309 schoolchildren (12,669 girls and 12,640 boys) aged 7–19 years (divided into 2 subgroups: children aged 7–12 y and adolescents aged 13–19 y) from the city of Lodz (Poland) were examined. Basic anthropometric measurements and three independent BP measurements were performed. SHtR/DHtR were calculated as a ratio of systolic/diastolic BP (in mmHg) by the body height (in cm). ROC curve analysis were performed to assess the accuracy of SHtR and DHtR as diagnostic tests of PHT and HT. The sensitivity (Se), specificity (Sp), and AUC (95% CI) were calculated to assess the performance of determined optimal thresholds. Separately for both sexes, the SHtR-, and DHtR-for-age percentile curves were constructed.

Results: The SHtR and DHtR values decrease significantly with age in children subgroup and only in the group of adolescents their values are clearly stabilizing. The optimal cutoffs for PHT were 0.85 in children group (Se/Sp = 58.6/97.4; AUC = 0.85) and 0.77 in adolescents subgroup (Se/Sp = 78.3/98.5; AUC=0.99) for SHtR and 0.56 in children (Se/Sp = 49.1/99.1; AUC=0.97) and 0.49 in adolescents (Se/Sp = 76.2/98.9; AUC=0.99) for DHtR, respectively. For HT, the optimal values were 0.88 (Se/Sp = 51.1/98.5; AUC=0.96), 0.79 Se/Sp = 79.4/98.9; AUC=0.99), 0.57 (Se/Sp = 40.2/98.5; AUC=0.97), and 0.51 (Se/Sp = 75.1/99.1; AUC=0.99), respectively. Performance of the SHtR and DHtR optimal thresholds for detecting HT were better compared to PHT in both analyzed subgroups.

Conclusions: Only for adolescents aged 13–19, the SHtR and DHtR indexes with cut-off points 0.77 and 0.40 for PHT and 0.79 and 0.51 for HT, fulfill the conditions of the accurate discrimination of elevated blood pressure condition, regardless of age and gender.

PO2.139

Mother's feeding practices related to overweight in 4–8-year-old children

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Background: Parents play an important role in the development of children's behaviour. For example, parenting has been related to (un)healthy behaviour and weight status of children in previous studies. The aim of this study is to 1) investigate the feeding practices (parenting related to food intake of children) of mothers, 2) if these feeding practices are associated with childhood overweight and 3) if these associations differ for mothers with or without overweight.

Method: A cross-sectional study was carried out among children aged 4–13 years in the city of Zwolle, the Netherlands (ChecKid 2012). In these children, data were available on measured height, weight and waist circumference, and from a parental questionnaire, on socio-demographic

characteristics, nutrition, physical activity, sedentary behaviour and feeding practices. For this study children were selected from grade 1 until 4 (age 4–8 years old) (n = 3,078). Feeding practices were divided into 4 scales: Instrumental feeding (food used as reward), Control (determine when, what and how much a child eats), Emotional feeding (using food as a reward) and Encouragement (compliment and encouraging food intake) with a score between 1 (=low) and 5 (=high). Associations were studied with logistic regression.

Results: On average, mothers have a high score on Control (4.3; sd:0.39) and Encouragement (3.8; sd:0.54) and a low score on Instrumental and Emotional feeding (1.7; sd:0.59 and 1.4; sd:0.47 respectively). Emotional feeding is associated with childhood overweight in this study (OR:1.31;95%-CI:1.03–1.67). This association differs for mothers with and without overweight (OR:1.14;95%-CI:0.72–1.80 and OR:1.48;95%-CI:1.01–2.16 respectively).

Conclusion: Generally, mothers in the city of Zwolle, the Netherlands have favourable feeding practices. Emotional feeding would be an issue of interest in the prevention of childhood overweight (i.e. giving a child food to make him/her feel better) among, especially, mothers without overweight. Professionals can support parents particularly in preventing emotional feeding practices.

PO2.140

Improving the nutrition-related knowledge and dietary pattern with the “Drinking and Break Time Snack License” – a teaching package for fifth grade students

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Background & Aims: In schoolchildren improving nutrition-related knowledge leads to increased self-efficacy and hence could reduce the prevalence of obesity [1]. In Europe, the prevalence of overweight was 21% in girls and 19% in boys [2].

Objectives: The purpose of this study was to determine the effect of a nutritional intervention on the increase of nutrition-related knowledge and changes of dietary patterns in Viennese schools. Material & Methods: The “Drinking and Break Time Snack License” is a nutritional intervention carried out by teachers with involvement of parents over 5 weeks in the 5th grade. 691 schoolchildren (9–17 years old) from 7 Viennese schools participated in this study. The nutrition-related knowledge questionnaire (20 nutrition-related questions), was assessed before and after the intervention. Principal component analysis (PCA) was used to identify dietary patterns of 24 food groups. It revealed two dietary patterns: energy-dense and healthful. BMI was calculated based on self-reports [3].

Results: 4% of all schoolchildren were obese and 15% overweight. The nutrition-related knowledge was improved significantly in the intervention (n = 233) by 21% compared to the control group (n = 115) by 6%. The intervention group showed a significant increase in nutrition-related knowledge [7.7 (7.3–8.0) vs. 9.3 (8.5–9.2) points; p < 0.001]. Figure 1 shows assignment changes of dietary patterns. After adjusting for age, sex, and initial nutrition-related knowledge, the intervention group showed a 1.8 times greater adherence to healthful dietary pattern [OR = 1.81 (95% CI 1.03, 3.2); p = 0.039], compared to the control group.

Conclusion: This analysis showed that the “Drinking and Break Time Snack License” can significantly improve nutrition-related knowledge. After the intervention, children had a greater adherence to healthful dietary pattern.

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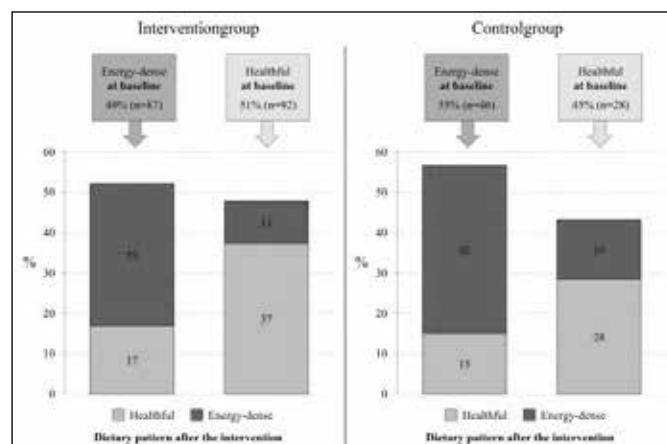


Fig. 1. Assignment changes of dietary patterns after the intervention compared with baseline for intervention and control group

PO2.141

Endothelial dysfunction and Obesity

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Introduction Chronic inflammation is a marker of endothelial damage which predisposes chronic inflammatory diseases which plays an important role in the development of atherosclerosis and diabetes mellitus and is involved in the pathophysiological mechanisms by which these two diseases are interrelated. Therefore establish the degree of chronic low-grade inflammation is a predictive and diagnostic target to start early on the appropriate treatment to delay or prevent the development of chronic diseases.

Objective: ¿Is chronic inflammation a marker of endothelial damage which in turn exacerbates or predisposed to suffer chronic inflammatory diseases?

Methods: We propose a correct evaluation of patients with obesity through inflammatory markers and determination of genetic test that will help us identify patients at high risk of both cardiovascular disease and insulin resistance and diabetes mellitus. We conducted the study in 100 patients where measurement of serum insulin was performed in fasting and fasting serum glucose and determination of genetic polymorphisms associated with cardiovascular disease and insulin resistance such as FABP2, PPARG, IRS- 1, Ile -6 and ACE genes

Results: Of the 100 patients studied, we found that 47% of patients had insulin resistance, hipercolesterolemia 49%, 45% hypertriglyceridemia. The most frequent genetic variant is the CT polymorphism of IRS-1 as well as the GG variant of Ile-6 and CC variant of PPARG

Conclusions: The study and proper management of patients with obesity may establish it early preventive strategies against cardiovascular disease and development of diabetes mellitus. The association between serum and genetic markers is a simple and inexpensive method to establish the risk of early and objective manner.

PO2.142

Exploring the feasibility and implementation of workplace dietary interventions: Views of the intervention deliverers

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Background and Aims: Workplaces are a reasonable setting for interventions that aim to support workers in achieving a healthier diet and body weight. However, little is known about the factors that impact on the feasibility and implementation of these interventions, and how these might vary by type of workplace and type of worker.

Objective: The aim of this study was to assess the views of intervention deliverers about factors they felt impact on the feasibility and implementation of workplace dietary interventions.

Materials/Methods: One-to-one semi-structured interviews were conducted with 11 individuals who had some level of responsibility for delivering workplace dietary interventions in England. Interviews were analysed using Burnard's systematic thematic content analysis, an adaptation of grounded theory incorporating thematic and content analysis.

Results: A number of factors were felt to promote the feasibility and implementation of interventions. These included interventions that targeted the whole workforce, and those which were cost neutral (to employee and employer). Also, interventions that were delivered informally, with colleagues for peer support, on lunchtimes, and well advertised and communicated via a variety of media (staff emails, website, intranet, and posters in the canteen). In addition, the offer of an incentive, not necessarily monetary, was perceived to increase recruitment rates. A number of factors were felt to militate against the feasibility and implementation of the interventions. These included workplaces that were large scale and/or remote, working patterns that included shifts and/or working outside of normal working hours, working patterns that were not conducive to workers being able to access intervention-related sessions, and workplaces that did not have appropriate provision for healthy food on site.

Conclusion: These findings can inform the development of effective workplace dietary interventions, and suggest that such interventions should be tailored to the nature of the worksite and the profile of the workforce. Particular attention should be given to aspects of the content and delivery of workplace dietary interventions that may impact on health inequalities.

PO2.143

Sugar-sweetened beverages and metabolic syndrome in obese children

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Background: The excessive consumption of sucrose, primarily used in sweetened beverages, has been considered an important inducer of cardiometabolic diseases. Besides the association between metabolic syndrome and fructose found in animal models, literature is lacking prospective studies in humans, especially in paediatric ages. This study assessed the effect of sugar-sweetened beverages reduction on blood pressure (BP), insulin resistance (HOMA-IR), lipid profile and uric acid, in obese children.

Patients & Methods: This was a prospective analysis of the first 200 pre-pubertal patients admitted to our hospital-based obesity clinic, during 2015 (64% females, 96% white, mean BMI z-score 2.9 ± 0.3). To access dietary intake, children were asked to make a three 24h-recall weekly. Sugar-added beverages were quantified as number of servings, and sucrose intake was calculated. During the first 4 weeks, patients had their usual diet. For the next 24 weeks, they were asked to restrict sugar-added beverages to one serving a week, keeping everything else as previously. We analyzed

changes from week 4 to week 28 in anthropometrics, blood pressure and blood markers of metabolic syndrome. Multivariate linear regression was used to evaluate the association between these variables and the amount of sugar drunk.

Results: At baseline, mean daily sucrose intake was 219 ± 62 g, of which 144 ± 14 g (about 66%) from sugar-sweetened beverages; mean systolic/diastolic BP z-scores were $1.8 \pm 0.6 / 1.7 \pm 0.4$ respectively; median HOMA-IR was 3.57 (1.34 to 6.43); mean uric acid was 4.1 ± 1.9 mg/dL; median triglycerides was 132 (72 to 201) mg/dL. After adjustment for potential confounders, the reduction of beverages to one serving a week was associated to a decrease of: 0.5 (95% CI, 0.3 to 0.7) and 0.4 (95% CI, 0.2 to 0.6) in systolic/diastolic BP z-scores correspondingly; 1.7mg/dL (95% CI, 1.0 to 2.2) in uric acid; and 44mg/dL (95% CI, 21 to 55) in triglycerides. These findings were kept after controlling for changes in BMI z-scores. On the other hand, no association was found for HOMA-IR. Discussion Our results provide additional evidence supporting a positive relationship between sweetened beverages and important markers of metabolic syndrome. Therefore, controlling its consumption by children is an urgent measure of public health.

PO2.144

Lean-seafood intake reduces cardiovascular lipid risk factors in healthy subjects – results from a randomized controlled trial with crossover design

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Introduction: Observational studies associate a high intake of animal protein sources, in particular red meat, with the development of metabolic disorders like insulin resistance, type 2 diabetes and cardiovascular disease. However, randomized controlled studies linking dietary major protein sources to metabolic health are still limited. Therefore, the current study was undertaken to elucidate the potential of two major animal protein sources, lean seafood or nonseafood (meat, egg, milk) to modulate risk factors for metabolic disease in healthy subjects.

Methods: This study was a randomized, controlled trial with a crossover design. After 3 wk run-in periods, and separated by a 5 wk wash-out period, 20 healthy subjects (7 men and 13 women) consumed two balanced diets (in energy%; 29% fat, 52% carbohydrates, 19% protein) for 4 wk that varied in the main protein sources; 60% of total dietary proteins from lean-seafood or nonseafood sources. At day 1 and 28 of each intervention, morning spot urine samples were taken, and fasting and postprandial blood samples were collected before and after, respectively, consumption of test meals with cod or lean beef.

Results: The diets did not alter serum insulin and glucose concentrations. However, relative to the nonseafood diet period, the lean-seafood diet period reduced postprandial serum lactate ($P = 0.012$) and serum triacylglycerol (TAG) ($P = 0.01$) concentrations. TAG was mainly reduced by a lower postprandial concentration of medium-sized VLDL particles ($P = 0.02$). The lean seafood intervention also prevented the postprandial serum elevation of total- to high-density lipoprotein (HDL) cholesterol ratio ($P = 0.01$) and of TAG/ HDL cholesterol ratio ($P = 0.002$) relative to the non-seafood intervention. The lean-seafood diet period reduced the urinary levels of L-carnitine ($P < 0.01$), 2,6-dimethylheptanoylcarnitine ($P < 0.03$) and N-2-pyridone-5-carboxamide (2PY) ($P < 0.01$), indicating changes in lipid and energy metabolism. Our serum data indicated that major dietary protein source induced alterations in carbohydrate and lipid metabolism, a notion that was supported by urine metabolomics data.

Conclusions: The dietary protein source determines postprandial metabolism in healthy subjects in a manner that may have impact on long-term development of insulin-resistance, type 2 diabetes and cardiovascular disease.

PO2.145

Relationship between Non-alcoholic fatty liver disease (NAFLD) and physical activity in young obese patients

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Background & Aims: Fatty Liver Index (FLI) is a predictor of hepatic steatosis in general population and Non-alcoholic fatty liver disease (NAFLD) has been reported associated with low levels of physical activity.

Objectives: To evaluate the relationship between 24 hours physical activity, anthropometry and fatty liver score in a group of very young obese patients.

Material & Methods: One hundred sixteen obese patients ($M=43$, $F=73$; BMI 40.7 ± 6.44 kg/m²), age 15–25 years (mean \pm SD 18.6 ± 2.82 y) were assessed for anthropometry and blood biochemistry. FLI was calculated, Energy Expenditure (EE) and physical activity level evaluated by the validated SenseWear Armband for 48 hours consecutively.

Results: FLI ≥ 60 was found in 91.4% of patients ($M = 41$, $F = 65$). FLI was inversely correlated with mean METs (Metabolic EquivalentT) ($r = -.245$; $p = .008$) and ALT/AST ratio ($r = -.491$; $p = .000$) and steps number/day ($r = -.235$; $p = .011$); In male patients it was inversely correlated also with active energy expenditure ($r = -.522$; $p = .000$), whereas in female only with ALT/AST ratio ($r = -.443$; $p = .000$).

Conclusion: Lower levels of physical activity were correlated with higher FLI, particularly in young male obese patients. The mechanisms underlying this relationship deserves further investigation.

PO2.146

Insulin resistance in overweight and obese adolescents is associated with gender, puberty stage and fat mass – a PREVIEW sub-study

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Background: During puberty transient insulin resistance occurs. Overweight and obese adolescents are at risk for higher insulin resistance levels and increased risk of developing diabetes early in life. With increasing rates of overweight and obesity in children, it is important to determine which factors contribute to insulin resistance of puberty in order to develop effective treatment strategies for diabetes prevention.

Objectives. The PREvention of diabetes through lifestyle Intervention in Europe and around the World study (PREVIEW, FP7 grant no. 312057), in collaboration with the Centre for Overweight Adolescent and Children's Healthcare (COACH), aims to identify effective lifestyle components in overweight and obese adolescents to prevent type-2 diabetes later in life. The purpose of this study was to evaluate associations between anthropo-

metric characteristics, body composition, puberty stages, physical activity and food intake on insulin resistance in overweight and obese adolescents. **Methods:** Anthropometric characteristics, body composition, Tanner stages, physical activity (Baecke questionnaire), and food intake behaviour (Three Factor Eating Questionnaire) were determined, and tested for associations with homeostatic model assessment of insulin resistance (HOMA-IR).

Results: 127 adolescents (53 male (M) 74 female (F), age 13.9 ± 2.3 y, BMI z-score 3.1 ± 0.7 , HOMA-IR 3.5 ± 1.4) were eligible for this study. HOMA-IR differed significantly for gender (M 3.3 ± 2.7 , F 3.7 ± 2.1 , $p = 0.021$). In both genders, HOMA-IR was positively associated with BMI z-score (M $r = 0.48$, $p = 0.003$; F $r = 0.47$, $p = 0.000$), puberty (M $r = 0.56$, $p = 0.001$; F $r = 0.29$, $p = 0.047$), waist circumference (M $r = 0.513$; $p = 0.000$; F $r = 0.33$, $p = 0.005$) and fat mass (M $r = 0.51$; $p = 0.001$; F $r = 0.42$, $p = 0.001$). After correction for age and BMI z-score, fat mass was a significant contributor to HOMA-IR in girls ($\beta = 0.020$; $p = 0.033$) but not in boys. No associations with lifestyle factors were observed.

Conclusion: Gender, puberty stage, BMI z-score and fat mass are independent contributors to insulin sensitivity in overweight and obese adolescents.

PO2.147

Phthalate metabolite in urine in relation to obesity dyslipidaemia, hypertension and type 2 diabetes

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Background & Objectives: Human exposure to phthalates may be associated with adverse metabolic health outcomes especially diabetes and obesity related metabolic diseases. **Material & Methods:** We have investigated urine samples of patients ($n = 170$) from metabolic outpatient department. Using standard metabolic syndrome criteria and used therapy criteria we have classified patients as dyslipidaemic ($n = 87$), hypertensive ($n = 96$) and type 2 diabetes ($n = 56$). The 24 hours samples were sampled in phthalate free bottles 15 metabolites of phthalates were evaluated in relation to creatinine excretion All were analysed with enzymatic cleavage of glucuronide using ultra-high-performance liquid chromatography-electrospray ionization tandem mass spectrometry in one laboratory with External Quality control.

Results: Four metabolites: (mono(3-carboxypropyl) phthalate, mono OH-, OXO-, cx- (mono 2-ethyl-5-hydroxyhexyl)phthalate) were significantly higher in diabetic versus non-diabetic patients using Mann-Whitney test ($p < 0.001$ $p < 0.002$ $p < 0.002$ $p < 0.005$) No difference was found between hypertensive and non-hypertensive and dyslipidaemic and non-dyslipidaemic patients. Using multiple regression no significant influence of age, BMI and waist was found. In the different subgroups (divided by gender, diabetes, hypertension, dyslipidemia) many phthalate metabolite correlated negatively to waist or BMI. But in the in the multiple regression none of the 15 phthalate metabolite is determined by BMI or waist.

Conclusion: Urine levels of some phthalates are significantly higher in type 2 diabetes. Phthalate levels can be in causal relation to beta cell dysfunction. This effect is not mediated by obesity. BMI – being in mostly negative correlation to phthalate levels- can be protective against high level of phthalaturia. No significant relation was found to dyslipidaemia and hypertension. Supported by a research grant of the Czech Ministry of Health IGA NT 14182–3 Conflict of interest: None

PO2.148

Preliminary Evidence on the H.E.A.L.T.H. (Healthy Eating, Activity, and Lifestyle Training Headquarters) Program: An Internet/Population-based Behavioral Weight Management Program for the U.S. Army

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Military personnel are not immune to the effects of overweight and obesity. A significant number of Soldiers exceed the maximum allowable weight standards, or have body weights approaching the maximum allowable weight standards as defined by AR 600–9, The Army Body Composition Program (ABCP). The present study tests the preliminary efficacy and dissemination of an Internet and Smartphone based program (H.E.A.L.T.H.; Healthy Eating, Activity, Lifestyle Training Headquarters) in National Guard Soldiers and their family members. The program targeted Soldiers who were currently or close to failing Army standards. A marketing program was put in place to enhance broad dissemination of the program throughout the targeted population and to encourage anonymous, sustained usage of the online/mobile program. Preliminary results include: 1) 2,909 Soldiers and 306 civilian family members logged on to the program, 2) Soldier demographics include: mean age = 28.7, Body Mass Index (BMI) = 27.2, 24.2% = women, and 63.8% = Caucasian; 3) Civilian demographics include: mean age = 33.51, BMI = 29.25, 74.84% = women, and 66.01% = Caucasian; 4) Participants who utilized the H.E.A.L.T.H. program lost weight; 5) Overall, the target population (Soldiers over screening table weight/overweight civilians) logged on to the program more frequently over time; 6) Participants who utilized the H.E.A.L.T.H. program more frequently lost more weight; 7) Participants reported overall satisfaction with the program. Preliminary evidence from the H.E.A.L.T.H. program, in National Guard Soldiers, suggests that Soldiers (and family members) will utilize an Internet/Smartphone based program for weight management if given the opportunity and are continually encouraged (marketing) to do so. The present study also shows that sustained use of an Internet/Smartphone based weight management/weight gain prevention program was associated with weight loss in overweight individuals and prevention of weight gain in non-overweight individuals.

PO2.149

Is obesity negatively associated with dental caries? A cross-sectional study among 6th grade schoolchildren

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Background and Aims: Obesity and dental caries share common risk factors, particularly the high dietary intake. This study tends to explore the association between dental caries and obesity among schoolchildren.

Objectives: To determine the association between dental caries and obesity in 6th grade students in Madinah, Saudi Arabia.

Methods: Four schools were selected via convenience sampling. The BMI was calculated and the decayed, missing, filled teeth (DMFT) index was used to record the dental caries status.

Results: 402 children (mean age 12.6 ± 0.7 yrs) were included. The mean BMI was 22.17 ± 5.2 ; 41% had a normal BMI, 25% were overweight and 30% were obese. The mean DMFT was 1.5 ± 2.0 . Children with normal BMI had a significantly higher prevalence of caries (57%) and DMFT score (1.9) compared to the overweight and obese groups ($p < 0.05$). Differences remained significant after controlling for confounders via linear regression. The mean BMI scores were significantly lower in those with severe caries compared to those who had mild or no caries ($p < 0.05$).

Conclusion: Schoolchildren who were under or normal weight had more caries compared to those who were overweight or obese. It can be speculated that established dental caries might have a negative impact on diet.

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PO2.150

Changes in blood levels of persistent organic pollutants (POPs) after weight loss

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Background & Aim: Persistent lipophilic organic pollutants (POPs) are stored in adipose tissue. Following rapid resolution of morbid adiposity, e.g. as induced by bariatric surgery, lipophilic compounds are presumed to be released into the circulation. Mobilized POPs may cause negative health effects, including endocrine disruptions. The objective of the present literature review was to estimate quantitatively the mobilization of POPs following a considerable weight loss.

Methods: The literature search was carried out in Medline, Embase, PubMed and Web of Science databases. Inclusion criteria were: Publication in English, report of POP concentrations in human blood before and after weight loss, and in both genders. According to these criteria 14 studies were identified, including 1758 participants. Data from 5 of the studies, including 270 participants could be used to assess the change in blood levels in percent per kg weight loss.

Results: Blood concentrations following weight reduction increased by 2.5–3.5% per kg weight loss for most of the POPs studied, but increases up to 13% per kg were observed.

Conclusion and Perspectives: The significantly increased blood levels of POPs following excessive weight loss, above 2.5% per kg weight loss, should be explored further, including its possible clinical consequences. **Acknowledgements** The support from Innlandet Hospital Trust is acknowledged. The authors have no conflicts of interest to disclose.

PO2.151

Pubertal stage: Prediction of cardiometabolic risk by BMI and waist circumference

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Background: Evidence suggests that puberty is associated with a clustering of cardiometabolic risk factors (CMRFs) in adolescents and in later

life. Few research has explored the possibly interaction effect of pubertal stage on the prediction of cardiometabolic risk by body mass index (BMI) or waist circumference (WC). We aimed to examine the associations between pubertal stage and CMRFs and the effect of pubertal stage on the prediction of cardiometabolic risk by BMI and WC. **Methods:** A cross-sectional school-based study was conducted among 1985 (95.1%) students aged 6 to 18 years. Fasting lipid profile and plasma glucose, blood pressure (BP), body weight (BW), body height (BH) and WC were measured. A self-reported pubertal stage questionnaire was used to collect pubertal stage of participants. Two cardiometabolic risk scores alpha and beta were constructed to quantify the cardiometabolic risk of the participants.

Results: The interaction of WC Z-score (ZWC) and pubertal stage demonstrated a significant increase in variance explained in cardiometabolic risk score alpha in boys (0.6%, $p = 0.010$) and girls (0.4%, $p = 0.035$) and in cardiometabolic risk score beta in boys (1%, $p = 0.008$) but not in girls (0.5%, $p = 0.071$). The interaction of BMI Z-score (ZBMI) and pubertal stage demonstrated a significant increase in variance explained in cardiometabolic risk score alpha in boys (0.5%, $p = 0.024$) and girls (0.7%, $p = 0.006$) and in cardiometabolic risk score beta in boys (0.8%, $p = 0.030$) but not in girls (0.5%, $p = 0.051$).

Conclusions: Pubertal stage has a moderator effect of pubertal stage on the prediction of cardiometabolic risk by both WC and BMI in boys and may have a similar but lesser effect in girls.

PO2.152

Prediction of Resting Energy Expenditure in obese male patients improves with BIA parameters

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Background: The relationship between Resting Energy Expenditure (REE) and body composition has not extensively been studied in severely obese patients.

Objective: to evaluate whether bioimpedance analysis (BIA) can be useful to develop predictive equations for REE in uncomplicated extremely obese adult patients.

Material/Methods: Sixty-hundred thirty three severely obese adult males (range 18–50 y) participated in the study (weight 134 ± 25 kg, BMI 43.8 ± 8.2 kg/m²). REE was measured by indirect calorimetry (V max29-Sensormedics) and bioimpedance analysis were performed at 50 kHz (DS Medica) in all patients. The following variables were considered as possible predictors of REE: 1) general characteristics: age, height, weight, BMI; 2) BIA measures: resistance, reactance, bioimpedance index ($\text{height}^2 / \text{resistance} = \text{BI index}$), and phase angle (PA). Statistical analysis was performed using linear correlation and multiple regression analysis (SPSS vers. 15.0).

Results: REE was strongly correlated (linear correlation) with body weight ($r = .692$), BMI ($r = .625$) and BI index ($r = .435$). The following predictive equations were obtained by multiple regression analysis. For individual general characteristics (age, body weight, height, BMI): $\text{REE (kcal/d)} = 12.478 \times \text{weight} - 3.134 \times \text{age} + 1045$; $r = .695$ SEE 259 kcal/d For BIA measures (resistance, reactance, BI index and PA): $\text{REE (kcal/d)} = 15.824 \times \text{BI index} + 53.858 \times \text{PA} + 949$; $r = .452$ SEE 327 kcal/d For individual general characteristics + BIA measures: $\text{REE (kcal/d)} = 12.486 \times \text{body weight} + 32.026 \times \text{PA} - 2.832 \times \text{age} + 794$; $r = .701$ SEE 235 kcal/d

Conclusion: This study suggests that uncomplicated obese adult males, REE can be estimated from body weight, the inclusion age and phase angle into the predictive equation improve the evaluation of REE

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PO2.153

Bisphenol A urine level in obesity and metabolic syndrome

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Background & Objectives: The Impact of organic pollutant Bisphenol A (BPA)- an estrogenic compound – is discussed in diabetes and metabolic syndrome.

Material/Methods: We have analyzed the urine bisphenol A/creatinine level in outpatients from metabolic department treated for obesity diabetes, hypertension or dyslipidemia (n = 168). Patients were classified according to therapy or metabolic syndrome criteria as dyslipidaemic (n = 87), hypertensive (n = 96) and type 2 diabetes (n = 58) and BMI and waist was measured in all patients. Statistical analysis was performed using Spearman correlation, Mann-Whitney test and multiple regression.

Results: 1. In the whole sample BPA was not significantly different in patients with metabolic syndrome components (diabetes, hypertension and dyslipidemia). 2. BPA has significantly negative correlation with BMI (p = 0.03) in the whole sample. 3. In men there was no significant negative relation to waist (p = 0.17) 4. In women there was borderline negative relation to waist (p = 0.08) 5. In men and women without metabolic syndrome components (diabetes, hypertension, dyslipidemia) all correlations to BMI and waist were significant and negative.

Conclusion: Urine level of BPA has negative relation to BMI and waist. Obesity is perhaps protective against high level of BPA. BPA has no significant relation to diabetes, dyslipidemia and hypertension in our sample of patients. Supported by a research grant of the Czech Ministry of Health IGA NT 14182–3 Conflict of interest: None

PO2.154

Perioperative obesity discussions in obese patients for non-bariatric surgery

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Introduction: The Australian and New Zealand College of Anaesthetists recently conducted a survey of members investigating their attitudes to the perioperative management of obese patients. The results suggested many strong opinions and beliefs around the increasing prevalence of obesity, the impact on perioperative events, the difficulties of managing such patients, and an apparent lack of awareness of perioperative risks from patients themselves. 64% of anaesthetists felt that obesity is the most common preoperative morbid condition in their practice, with 95% feeling that obesity increases perioperative risks. It also found that many anaesthetists were unsure of how best to approach a discussion of risk or weight loss management with obese patients, with comments such as 'obesity is the new 'norm'. I feel 'politically incorrect' if I have to discuss with patients their extreme weight and the problems it can cause'.

Aim: To systematically review the literature to identify current best practice regarding perioperative discussions with obese patients.

Methods: A literature review will be conducted following standard guidelines with collaboration between our various hospital and University departments and the Australian and New Zealand College of Anaesthetists. Best practice will be confirmed by consultation with a specialist obesity physician and a medical communication expert.

Results: Pertinent survey results are shown in the tables. Results of the review will be presented at the meeting.

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PO2.155

Accuracy of predictive equations for estimating Resting Energy Expenditure in obese male patients

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Background: During the last three decades the prevalence of overweight and obesity has increased in European adolescents. An accurate assessment of energy requirements is needed to improve individual clinical evaluation in order to plan an appropriate dietary intervention. Indeed, in obese subjects an accurate prediction of resting energy expenditure (REE) is of utmost importance for an adequate dietary prescription in view of the fact that it provides the basic background to calculate a desired level of energy restriction.

Objective: The study aimed to compare resting energy expenditure (REE) measured (MREE) by indirect calorimetry (IC) in obese male patients with REE predicted (PREE) using different equations.

Material/Methods: We recruited 650 obese male patients (age 34.2 ± 10.3 y, 136 ± 25 kg, height 175 ± 7 cm, BMI 44.4 ± 8.0 kg/m²). Data were obtained comparing MREE with PREE derived from published equations for normal weight (Harris-Benedict, FAO and Schofield) and obese (Lazzer, Johnston and Wang). The average differences between PREE and MREE, as well as the accuracy at 10% level, were evaluated.

Results: Evaluating the mean REE in 650 males (2625 ± 451 kcal/d), we found the smallest difference in percentage between PREE and MREE using the Harris-Benedict ($99.4 \pm 12.8\%$) and Lazzer equation ($95.8 \pm 12.4\%$). The level of accuracy at 10% level resulted very low (< 50%) in all equations considered.

Conclusions: The study shows that Harris-Benedict and Lazzer equations can be used for population studies whereas in clinical practice (individual patient) none equation seems to be accurate and measurement with Indirect Calorimetry should be carried out. Inaccuracy of predicted REE could affect calorie restriction adequacy and consequently dietary compliance.

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Body shape perception and satisfaction in the GrowUp 1990 Gothenburg cohort: Effects of gender, socioeconomic background and weight status

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Objective: To study the associations between body shape perception/satisfaction and actual weight status in the Swedish GrowUp 1990 Gothenburg cohort.

Material/Methods: Weight and height of 5264 adolescents were measured in 2008–2009 in their final year of high school. Body shape perception/satisfaction was assessed through nine standard silhouettes. Adolescents chose which of the silhouettes they currently resembled, as well as which one they would like to resemble. The silhouettes were assigned a corresponding weight status: silhouette 1 corresponded to thinness, 2–4 to normal weight, 5–6 to overweight without obesity, and 7–9 to obesity. Over- or underestimation of body size was estimated by comparing actual weight status and perceived body shape. Body dissatisfaction was defined as a discrepancy between perceived and desired body shape of one shape or more. Socioeconomic status (SES) was based on percent of parents with high education in each school. Multiple linear models were applied to evaluate the associations between weight status and body shape perception and body shape satisfaction by gender and adjusted for SES.

Results: The majority of obese adolescents underestimated their body size; only 24% of girls and 14% of boys correctly described themselves as obese. Of thin students, 98% overestimated their body size. Girls with body shape satisfaction were more likely to have a correct perception while satisfaction was not an explaining factor in boys. One third of girls and half of boys were satisfied with their current body shape, with satisfaction at only 4% and 17% for girls and boys with obesity respectively. Boys and girls with overweight and obesity were less satisfied than normal weight students. Girls with thinness and girls who had a correct body shape perception were more likely to be satisfied with their shape. In contrast, boys with thinness were less likely to be satisfied. SES was not associated with body shape perception or satisfaction.

Conclusion: The high prevalence of body shape dissatisfaction in this cohort of Swedish adolescents is concerning since the associated mental health consequences are numerous. Different strategies may be needed for girls and boys in achieving body shape satisfaction.

Metabolic Syndrome in Industrial Workers from South Baja California, México

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Background: Due to the increase of obesity, diabetes, hypertension and dyslipidemia, the metabolic syndrome (MS) represents a growing public health problem worldwide (1–3). Objective Determine the proportion of people with MS among a population of industrial workers from rural South Baja California, Mexico.

Methods: Body mass Index, waist circumference, blood pressure, glucose, HDL cholesterol, and triglycerides were assessed. The criterion of the Na-

tional Cholesterol Education Program Adult Treatment Panel (ATP III) was applied to establish the MS prevalence.

Results: One hundred and seventy one 19 to 61 yo male individuals were assessed. According to WHO BMI criteria, 26% were overweight and 69% had obesity. The highest prevalence of age-adjusted MS in the 41–50 age group was 59%, and the lowest incidence was observed among the 30 to 40 yo. The prevalence of MS in the total population was 52.6% (95% CI). All individuals had, at least, one component of the MS.

Conclusion: Among this population of rural industrial workers, a high prevalence of obesity and MS was observed. Changes within this industry's employees lifestyles and at home are recommended to reduce and prevent the development of the components of MS.

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The authors declare that they have no conflict of interest.

Is serum 25-hydroxy vitamin D level associated with liver enzymes in adolescents? The CASPIAN- III Study

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Background and Aim: Hypovitaminosis D is highly prevalent, and has several adverse health effects. This study aims to assess the relationship of serum concentrations of 25-hydroxy vitamin D [25(OH)D] and liver enzymes in adolescents

Material/Methods: This population-based cross-sectional survey was conducted among a nationally representative multi-stage sample of 1095 adolescents (52% boys), aged 10–18 years, living in different provinces of Iran. Serum 25(OH)D concentration <30 ng/mL was considered as hypovitaminosis D, and liver enzymes (alanine aminotransaminase, ALT and aspartate aminotransaminase, AST) of > 40 U/L as high level. To determine the association between serum 25(OH)D categories and elevated levels of liver enzymes, multiple regression models and linear regression analysis were applied, after adjustment for potential confounders. Odds ratio (OR) 95% confidence interval (CI) of serum 25(OH)D and elevated liver enzymes were assessed by logistic regression analysis.

Results: Higher rates of vitamin D deficiency were documented among individuals with increased levels of liver enzymes. Compared to boys, median of 25(OH)D was lower in girls with elevated levels of liver function tests (12.75 vs. 25.60 ng/mL for ALT, and 13 vs. 14.10 ng/mL for AST), with marginally significant gender differences regarding AST.

Conclusion: We found a relatively high frequency of hypovitaminosis D among adolescents with abnormal liver function. Further prospective studies are needed to examine these associations from early life.

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PO2.160

Comprehensibility of the nutritional recommendations

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Nutrition plays an important role as in the prevention as during treatment in many disease. In obesity and overweight, nutrition with physical activity is an essential element of both prevention and treatment. The basic recommendation is to limit and change the composition of fats, cholesterol, as well as simple sugars and alcohol. Also important is the source and way of getting information about changing eating habits, their validity and especially their comprehensibility and grasp by common population. In an ongoing survey, we focused on obese patients with CVD. Interviews are conducted in person with randomly addressed clients of GP, obesitologists or cardiologists. At present, 63 interviews were performed (23 males, 40 females). For now, you cannot say firm conclusions, but some trends can be observed. Almost 1/3 confirmed that it was sufficiently informed by their doctor about the necessary nutritional changes. 98% of “the educated” respondents received only printed form of recommendations without further comment. 80% of respondents under general recommendations cannot imagine real food or their quantity. The biggest problem is with omega 3 fatty acids and their sources. 67% of respondents are not able or willing to regularly consume fish and other sources of omega-3 fatty acids do not know. In the conditions of the CZECH REPUBLIC will be very difficult to reach fish consumption in the frequency of twice a week in the Czech Republic the need to take account of the available resources n 3 MK (canola, flax, walnuts). Most of respondents noted that the ideal form of recommendations would be illustrative examples and serving food. Supported by: Long term plan of development of organization 2011

PO2.161

Impact of dietary habits and mental health on nutritional status of adolescents

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Background and Aims: During the last few decades, progressive increase in overweight and obesity has been observed in young population. Insufficient, excessive or unbalanced diet influence not only adolescents' nutritional status but also the risk for major chronic diseases and mental wellbeing. The aim of this study was to investigate the correlations among lifestyles, eating habits, nutritional status and intellectual capabilities of adolescents.

Methods: A cross-sectional study was carried out using anthropometric measurements and standardized food questionnaire. Data were collected from 151 adolescents, 15 – 19 years old, in a secondary school in Kragujevac, Central Serbia. Academic achievement was expressed through grade point average (GPA) in the previous academic year. Intellectual capabilities were defined through Cybernetic battery of intelligence (KOG 3).

Results: According to body mass index, 4% of adolescents could be considered as underweight, 7.9% were overweight and only 6.6% were classified as obese. A high percentage of the respondents reported frequent consumption of white flour bread, over-salted and fast foods, pork, refined sunflower oils and saturated animal fats. Furthermore, 15.6% of the students have below average intelligence and 18.3% of them have an IQ (intelligence quotient) higher than 110 (all of them being boys).

Conclusion: No significant correlation between irregular eating habits and bad nutritional status of adolescents was found. There is no evident correlation between academic performance and nutritional status of adolescents.

PO2.162

Molecular Genetic Study of Obesity in Children Moroccan

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Objectives: Study of genetic markers predisposing to severe early-onset obesity in children.

Material/Methods: We identified nine index cases with severe early-onset obesity six have a family history of obesity. Among 5 CI obese, one CI present micropenis 2 CI dyslipidemia associated with hypothyroidism and hypogonadism, one CI present type 2 diabetes associated with metabolic syndrome. Sex ratio is 1 (5G / 4F). Their average age: 3 years 8 months with an age of onset of obesity ranging from birth to 7 months. The mean birth weight of patients is 3800 ± 1209 Kg and their average BMI was 32.4 ± 7.2 kg / m2. The search for genetic mutations was performed in a specialized laboratory (Center Human Genetics of the Institute of Biology of Lille-France). The sequencing was performed on the gene for the leptin / leptin receptor using the sequencer (or Haloplex Rain Dance).

Results: Four CI with a severe deficiency of leptin (<1 percentile) and a CI that has a resistance to leptin (> 99th percentile) compared to the reference values of leptin found in children of the same BMI and same stage of puberty. Their rate mean leptin: 32.4 ± 24 1 ng / ml. The molecular study identifies four new mutations: two homozygous mutations of which on the leptin gene and the other on the receptor gene to leptin and two mutations are identified with a heterozygous mutation and another double heterozygous gene on the leptin receptor.

Conclusion: This original work relates two very interesting homozygous mutations: a mutation in the leptin gene which generates the phenotype (Ob / Ob) due to dysregulation in the hypothalamus and a mutation in the receptor (LEPR), expressed by damage hypothalamic endocrine (hypothyroidism and hypogonadism), the cause of severe early-onset obesity.

PO2.163

Campus Obesity: The Taboo Topic

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The topic of obesity in the United States has sensitized many to the point where we do not discuss it, let alone attempt to verify and address this hypokinetic condition. Not surprisingly, progress in halting creeping obesity in the USA has been nonexistent for some three decades. There are many factors that contribute to such blind neglect, e.g., fat acceptance movement, and Americans' adamant right to “choose poorly”. These influences will be discussed in this session with particular attention focused upon the college campus where recent attempts to alert students at-risk for obesity co-morbidities made national and international headlines. When universities are reluctant to speak out about obesity threats to one's health status for fear of incurring adverse and ill-informed criticisms (aka polit-

ical correctness), the bastion of truth-seeking and truth-disseminating is mortally compromised.

PO2.164

Correlation between Dietary Fat and Anthropometric Measures on Body Fat Composition in Healthy Individuals

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This research was planned and carried out to evaluate the correlation between body fat compositions acquired with different techniques and dietary. Forty six adult individuals (37.0 ± 12.36 years) participated in the research, 12 of whom (26.1%) were men and 34 of whom (73.9%) were women. Height, body weight and waist-hip circumference of the individuals were measured, and body mass index (BMI) was calculated. Furthermore, in order to determine abdominal fat mass percentage, Viscan (an abdominal bioelectrical impedance analyzer) was used; and to determine body composition, InBody 720 (a multi-frequency bio-impedance analyzer) was used. Twenty four-hour food consumption record of individuals was taken; and energy and nutrients amounts were determined with Nutrition Information Systems (BeBis) programme. According to body mass index classification, 2.2% of individuals were underweight, 32.6% were of normal weight, 41.3% were overweight and 23.9% were obese; besides, only 23.9% of them had height-waist ratio under 0.5. A statistically significant positive correlation was found between visceral adiposity index and waist/height ratio ($r:0.460$, $p:0.001$), waist-hip ratio ($r:0.533$, $p:0.000$), and BMI ($r:0.564$, $p:0.000$). A significant positive correlation was also found between dietary fat (%) and waist/height ratio ($r:0.328$, $p:0.026$), body fat percentage ($r:0.428$, $p:0.003$), and BMI ($r:0.321$, $p:0.030$); on the other hand no correlation was found between dietary fat (%) and visceral adiposity index ($r:-0.052$, $p:0.730$). When the relationship between daily dietary energy intake and anthropometric measurements was examined, the daily dietary energy intake correlates only with body fat percentage ($r:-0.332$, $p:0.024$). In conclusion, this study was revealed that increase in the dietary fat (%) correlates with increasing waist/height ratio and BMI.

PO2.165

The obesogenic environment in an overweight and obese pregnant population

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Background: Maternal obesity in pregnancy is reaching epidemic proportions but the drivers of maternal adiposity are multifaceted and constitute more than simple energy imbalance. Personal choices and environmental factors also contribute to the rising rates of obesity. The obesogenic environment refers to factors that influence individuals to become excessively overweight. They are classified as micro-environments (school, workplace, home, neighbourhood) or macro-environments (education and health systems, government policies, societies' attitudes and beliefs). We sought to assess the obesogenic micro environment, sleep patterns of an overweight and obese pregnant cohort.

Methods: This is a prospective cohort study with institutional ethical approval and maternal written consent. Women with BMI >25 kg/m² were recruited from the antenatal clinic and a lifestyle questionnaire assessing their obesogenic risk factors was administered.

Results: Fifty women were included in the analysis; 36 (72%) overweight, 14 (28%) obese. Over 80% of the group lived adjacent to green space and/or gym facilities although only moderate use of both was reported. Women reported easy access to public transport in the community however, less than half reported using these facilities. There was easy access to fast food premises in the majority of cases ($>80\%$). A large proportion of women reported poor access to work canteen facilities (71%) with up

to 40% leaving the workplace at meal times. Analysis of sleep duration revealed women in the group slept on average 6.5 hours per night.

Conclusions This study has highlighted deficiencies in the physical, workplace and personal micro environments that could contribute to maternal adiposity. Devising future healthy lifestyle interventions for pregnant women at a national level should also target micro-environmental factors to tackle maternal obesity and improve the health of the next generation.

Table 1. Participant baseline demographics

Total Sample	N = 50 Mean (SD)
Age (years)	32.05 (3.4)
BMI (kg/m ²)	30.19 (4.2)
Gestational age (weeks)	21.5 (2.1)
Overweight	N (%)
Obese	36 (72%) 14 (28%)
Parity	
Primiparous	23(46%)
Education level attained	
2nd level	16 (32%)
3rd level	34 (68%)
Ethnicity	
Caucasian Irish	43 (83.32%)
Caucasian other	5 (10%)
South American	2 (4%)
Smoker	2 (4%)

Table 2. Micro environment pregnancy questionnaire

Physical Environment	N (%)
Access to green space	44 (88)
Use of green space	28 (56)
Access to sports facilities or gym	42 (84)
Use of sports facilities or gym	10 (20)
Access to public transport	39 (78)
Use of public transport	22 (44)
Access to fast food premises	41 (82.3)
Use of take-away	11 (23.7%)
Work environment	N (%)
Access to canteen facilities	14.5 (29%)
Leave work premises at meal/snack times	19.8 (39.75)
Personal Environment	Mean (SD)
Sleep duration (hours)	6.5 (2.1)

PO2.166

Individual and institutional correlates describing first year undergraduate weight change in England

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Background: Transition from high-school to university is a critical period for weight gain. This phenomenon, known as the Freshman 15, reflects

the claim that students gain 15lbs(6.8kg) in their first year of university. The settings approach, based on the holistic view of health, is adopted to create supportive environments such as healthy universities. Within this approach, the socio-ecological model provides a framework that incorporates correlates at many levels of influence to describe health behaviours in specific settings (intrapersonal, interpersonal, institutional, community and policy). No study has yet explored the Freshman 15 from that perspective. We aimed to create the first national study to investigate weight change in first year students from a socio-ecological perspective.

Methods: We developed a short online survey to collect data on weight change from a socio-ecological perspective. First year undergraduate students provided their weight, height and demographics. We also collected data for correlates at the intrapersonal and interpersonal level and perceived institutional environment. There were three time points: academic year start, December and academic year end. We performed univariate regressions and stepwise AIC regressions to identify the model best describing weight change in the overall sample, females, males, weight gainers and weight losers.

Results: The complete case sample was composed of 151 students across 21 universities. Over the academic year, the university quantity of green space, unhealthy friends, smoking, baseline weight and sex were included in the best AIC model for weight change, with an adjusted R² of 10%. Over the second academic term, 8 correlates described 17% of the weight change variance. In weight gainers, 15 correlates were included in the best AIC model for the academic year and the R² was 58.8%.

Conclusion: Weight gain in university students can be explained by correlates at the intrapersonal, interpersonal and perceived university environment. The high R² of perceived environment correlates and best AIC models indicate that weight change needs to be tackled from an SEM perspective rather than from an individual perspective.

Reference:

1 Vadeboncoeur et al. 2015. A meta-analysis of weight gain in first year university students: the case for the Freshman 15?. *BMC Obesity*,2:22

PO2.167

An Evaluation of the Relationship between Handgrip Strength, BMI and Dietary Components in Healthy Adults

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This research was conducted and carried out to evaluate the relationship between handgrip strength and body mass index (BMI), muscle mass, dietary energy, protein and animal protein intakes. In this study, 26.3% (n:20) of the participants (n:76) are men, 73.3% (n:56) are women and the average age of participants is 37.1 ± 13.08 years. Height and body weight of individuals were measured and BMI was calculated. In-Body 720 (a multi-frequency bio-impedance analyzer) was used to determine the body skeletal muscle mass. Three day-food consumption record of individuals was taken and energy and nutrient amounts were determined with Nutrition Information Systems (BeBis) programme. According to BMI classification, 39.5% of individuals were of normal weight, 35.5% were overweight and 25.0% were obese. Averages of skeletal muscle mass and handgrip strength were 33.88 ± 4.93 kg and 36.40 ± 6.33 in men, whereas 23.41 ± 2.58 kg and 22.47 ± 4.48 in women. According to BMI classification, the mean skeletal muscle mass and handgrip strength were 3.87 ± 3.67 kg and 23.92 ± 4.51, 28.01 ± 6.86 kg and 29.16 ± 9.76, 27.17 ± 5.56 kg and 25.32 ± 8.38, respectively in normal, slightly overweight and obese individuals. Skeletal muscle mass and handgrip strength were found to be higher in overweight individuals than in normal weight individuals; and the difference was statistically significant (p:0.015, p:0.032 respectively). Handgrip strength was correlated with weight (r:0.447, p:0.000), skeletal muscle weight (r:0.767, p:0.000) and daily energy intake (r:0.309, p:0.007). No significant relationship was determined between total protein intake (r:0.008, p:0.948), protein intake amount per bodyweight (r:0.156, p:0.178), animal protein amount (r:0.018, p:0.877) and handgrip strength. In conclusion, it was determined that there was

a correlation between handgrip strength, which is an indicator of muscle strength, and bodyweight and skeletal-muscle mass; on the other hand, the amount and composition of dietary protein had no effect on handgrip strength.

PO2.168

Comparison of two self-report measures for the assessment of internalized weight stigma: The Weight Self-Stigma Questionnaire versus the Weight Bias Internalization Scale

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Background & Aims: Internalized weight stigma characterized by applying predominant, negative weight stereotypes to the own person has gained growing interest in the last decade due to its association with crucial health related aspects. For assessing internalized weight stigma, two self-report questionnaires are available but have never been compared regarding their psychometric properties and predictive values for health outcomes: the Weight Bias Internalization Scale (WBIS) and the Weight Self-Stigma Questionnaire (WSSQ).

Objectives: The present study aimed to provide reliability, validity, and predictive values for diverse psychosocial health outcomes for the German WSSQ and WBIS and to compare both measures on these characteristics. Material & methods. In N = 78 bariatric surgery candidates, internalized weight stigma was measured via the WSSQ and WBIS. Further, anxiety, depression, self-esteem, quality of life, and body image were assessed by well-established self-report questionnaires. For evaluation of scale characteristics of the WSSQ and WBIS, reliability, correlation, and regression analyses were conducted.

Results: Internal consistency of the WSSQ was acceptable, while the WBIS had good internal consistency. Regarding convergent validity, the WSSQ was significantly correlated with the WBIS (large effect). Both measures were significantly associated with body image (small to medium effects), while only the WSSQ was correlated with overweight preoccupation (small effect). Both the WSSQ and the WBIS were positively associated with generalized anxiety (medium effects). Further, both measures significantly predicted quality of life, self-esteem, and depression (medium to large effects), while predictive values for the WBIS were higher compared to the WSSQ.

Conclusion: Our results indicate the German WSSQ and WBIS to be reliable and valid assessments of internalized weight stigma in bariatric surgery candidates, although the WBIS showed somewhat more favorable results than the WSSQ. Longitudinal studies are needed in order to provide data about stability and predictive validity of both measures, e.g. for weight-related and psychosocial outcomes.

PO2.169

The relationship between body image and weight-related shame and loss of control of eating in participants of a weight management programme

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Background & Aims: Obesity is recognised as a stigmatised condition and weight-related stigma is associated with shame (1). Recent studies

suggest that body image and weight-related shame is associated with self-criticism, and aspects of control of eating, such as perceived hunger and disinhibition.

Objectives: The current study examined the impact of body image and weight-related shame on loss of control of eating (binge eating symptomology) using a path analysis to examine the associations between weight status, body image shame and binge eating symptoms, considering the mediator effect of self-criticism and eating guilt.

Material/Methods: 738 female participants of a commercial weight management programme (BMI ≥ 25) completed an online survey including standardised psychometric measures of body image shame, self-criticism, eating attitudes and behaviours and binge eating symptoms.

Results: BMI was significantly correlated with body image shame. Path analysis results suggested that, when controlling for the effect of BMI, body image shame still had a significant indirect effect on binge eating symptoms, mediated by self-criticism and eating guilt. In turn, self-criticism was associated with increased binge eating symptoms, and its effect was mediated by eating guilt. The model accounted for 47% of the variance of binge eating symptoms and presented very good model fit indices [$X^2(1) = 2.033$; $p = 0.154$; CFI = 0.999; TLI = 0.992; RMSEA = 0.037; SRMR = 0.011].

Conclusion: These cross sectional associations suggest that BMI is associated with negative emotions and self evaluations (body image shame and self-criticism), which in turn are associated with loss of control of eating in some participants of a commercial weight management programme. These findings help identify how aspects of emotion regulation can disrupt self-regulation of weight management behaviours. These results support the concept that targeted non-stigmatic approaches to weight management that specifically help reduce self-criticism and eating guilt issues may help limit loss of control of eating (binge eating symptomology) in participants of weight management programmes.

Reference:

1 Puhl MP & Heuer CA, 2009 Obesity; 17: 941–964.

PO2.170

Weight-loss reduction and maintenance predictors identify phenotype sub-groups in a community setting

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Background: modest weight loss and maintenance is health beneficial and challenging. The study aim was to identify predictors associated with modest 5% weight reduction (initial 6 months) and maintenance (1 year) in overweight and obese adults undergoing weight reduction treatment in a community setting.

Methods: computerized medical files of 11,842 adults attending 162 primary clinics were retrospectively analyzed. Thirty medical, biochemical and demographic independent variables were tested as potential predictors using multiple logistic regression models (SPSS 19).

Results: Significant predictors of successful weight reduction were: higher baseline BMI, (OR 1.05), younger age (OR 0.988) and not being treated with insulin, (OR 0.53). Predictors of weight maintenance were: higher baseline BMI (OR = 1.03), frequent weighing ($p = 0.003$). Visits to a dietitian were significantly associated with success during both periods: each visit raised the probability of success by 13.4% and 7.6%, respectively ($p < 0.0001$). Successful initial weight reduction was a major contributor to successful maintenance, (OR = 1.26), ($p < 0.0001$). Type-2 diabetes or use of hypoglycemic drugs were not significant predictors. Significant predictors of late success in weight reduction were: more visits to a dietitian,

higher baseline BMI, and any initial weight reduction (OR = 3.69). The use of insulin (OR = 0.499) and the presence of hypertension (OR = 0.75) were significantly correlated with failure to reduce weight. Predictors of late maintenance were as follows: more visits to a dietitian, higher baseline BMI, any initial weight reduction, a younger age, not being treated with insulin (OR = 0.316), and more weighings (OR = 1.68).

Conclusions: In a community based setting, the number of visits to a dietitian is a strong predictor of successful weight reduction and maintenance. Initial success is a critical predictor of weight loss maintenance. While diabetes does not significantly affect weight loss outcome, a subgroup of diabetic older patients who are treated specifically with insulin have a dramatically lower probability of succeeding in weight reduction. A substantial sub-group of obese and overweight patient's loss weight at a slower rate than the defined successful time of 6 months.

PO2.171

Trajectory of human adipose tissues and ectopic fat deposits during weight loss intervention – the CENTRAL MRI randomized trial

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Background: Following our previous 2-year DIRECT randomized trial and its 4-year follow-up, we aimed to address the trajectory of human adipose tissues and ectopic fat deposits during a new weight loss intervention.

Methods: During an 18-month trial (ClinicalTrials.gov Identifier: NCT01530724), whereas we randomly assigned participants with mild abdominal obesity/dyslipidemia to lifestyle strategies, we followed the dynamics of body fat composition, using whole-body MRI at 0, 6, 18 months.

Results: Of 278 randomized participants [age = 48yr; 88% men; body-mass-index = 30.8 kg/m²] 86% completed the trial. At baseline, participants had a mean of 33% visceral adipose tissues (VAT), 10% Hepatic fat, 17% pancreatic fat, and a volume of 365mL total pericardial fat. Among the traditional biomarkers, TG/HDL-c ratio >3 was mostly associated with significant increase of VAT proportion. All fat depots significantly decreased after 6 and 18 months but to different degrees. Greater 18-month changes were observed for Hepatic:-32%, deep superficial-adipose-tissue (deep-SAT):-29%, VAT:-25%, superficial-SAT:-19%, intra-pericardial:-14%(-25 mL) and renal fat:-9%. Lesser changes were observed for femoral Intermuscular-adipose-tissue:-2% and pancreatic fat:-1%. During 7–18 months (body weight regain/maintenance phase), superficial-SAT exhibited the least loss, and VAT displayed the highest regain. After adjustment for age, sex, weight changes and intervention groups, 18-month VAT loss was associated with improved lipid profile, while deep-SAT loss was associated with improved insulin sensitivity.

Conclusions Human depots/ectopic-fat-deposits are substantially variable in their capacity to respond to weight loss. Changes in abdominal fat depot might be differentially associated with clinical outcomes.

Classification, Management And Outcomes Of Patients With Gastrogastric Fistula After Roux-En-Y Gastric Bypass

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Background: Gastrogastric fistula (GGF) is a known complication after Roux-en-Y gastric bypass (RYGB) that can lead to marginal ulceration (MU) and failure of weight loss.

Objective: Describe our experience with GGF management and to propose a classification of GGF based on imaging findings.

Methods: The medical records of 1900 patients with RYGB were entered in a prospective database. All patients with upper gastro-intestinal symptoms were submitted to both an upper endoscopy and contrast study. According to endoscopic and radiologic findings GGF was classified as type 1 when located in the proximal part of the gastric pouch and type 2 when located on the distal part of the gastric pouch near the gastrojejunostomy. We have studied the correlations between radiological and endoscopic findings and therapeutical outcome for patients with GGF.

Results: Nine patients developed a GGF (0.5%), 6 women and 3 men with a mean age of 39 ± 5 years. GGF symptoms included epigastric pain (78%), vomiting (11%), gastrointestinal bleeding (11%) and weight regain (33%). Upper contrast study identified GGF in all patients. Upper endoscopy confirmed GGF in 6 patients and showed an associated MU. Of the 9 patients, 3 had type 1 GGF and 6 a type 2 GGF. 8 patients required revisional surgery, 3 with type 1 GGF for weight regain and 5 with type 2 GGF for intractable epigastric pain. Mean time between GGF diagnostic and revision was 22.1 months. Patients with type 1 GGF had excision of the fistulous tract. Patients with type 2 GGF had revision of the gastrojejunostomy and limited remnant gastrectomy. Mean operative time was significantly longer for type 2 GGF than for type 1. Complication rate was not different between the 2 groups. The mean follow-up was 43 months. At the last follow-up point, all revisional patients were symptom free.

Conclusion: Clinical presentation and endoscopic findings depend on GGF precise location. Upper contrast study is mandatory to locate precisely the GGF to tailor the revisional surgery.

Body image and weight-related shame prospectively predict binge eating symptomatology and weight outcomes: The value of deshaming approaches to weight management

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Background & Aims: Cross sectional associations suggest that BMI is associated with body image shame, which, in turn, is associated with negative self evaluations and loss of control of eating (binge eating symptomatology) in some participants of a commercial weight management programme.

Objectives: The current study investigated the prospective effect of body image shame on weight outcomes, measured as change in body mass index (BMI), considering the effect of binge eating symptoms as a mediator, over a six-month period.

Material/Methods: 296 participants engaged in a commercial weight management programme completed an online survey including standardised psychometric measures of body image shame, eating attitudes and behaviours and binge eating symptoms at baseline, 3 and 6 months.

Results: Results indicated that from baseline, through to 3 and 6 months of assessment, there was a decrease in the mean scores of body image shame, binge eating symptoms and BMI. Within this period, baseline measures of body image shame significantly predicted binge eating symptoms at 3 months. Mediation analysis indicated that there was a significant prospective indirect effect of baseline body image shame, which, led to less weight loss at 6 months, and was fully mediated by binge eating symptoms measured at 3 months. The analysis controlled for the effect of BMI measures at baseline and 3 months, and baseline binge eating symptoms.

Conclusion: This study supports the hypothesis that body image shame is a significant predictor of binge eating symptoms and that binge eating symptoms in turn, have an effect on extent of weight loss. Those who had greater body image related shame showed higher binge eating symptomatology and lost less weight and vice versa. These findings suggest that non-stigmatic approaches that target weight-related shame may improve self-regulation of eating behaviour (decreased binge eating symptomatology) and improve weight management capability in commercial weight management programmes.

Reduced overall mortality following obesity surgery

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Background and Aim: Obesity is associated with increased mortality in numerous diseases. Bariatric surgery has shown to prevent obesity related mortality and morbidity (1). However, there is a lack of population-based prospective studies examining overall mortality in patients who undergo gastric bypass.

Objectives: The objective of this study was to assess overall mortality in obese individuals undergoing bariatric surgery compared to nonsurgical obese patients.

Material/Methods: From the Swedish Patient registry, a person-based register of all hospitalizations and hospital-based outpatients' visits in Sweden, we created a cohort including all patients with a principal diagnosis of obesity in Sweden from 2000 until 2011. The study population comprised 49,141 patients >18 years of whom 25,626 underwent bariatric surgery (gastric bypass 93.4%) while there were 23,515 nonsurgical obese patients.

Results: The mortality rate was higher in the non-surgical group (4.36%) compared to the surgical group (0.80%) (91.6 vs. 19.2 deaths per 10,000 person-years). Mean follow-up time for the surgical group was 4.1 years (95% confidence interval (CI) 4.11–4.18) and 4.2 (95% CI 4.72–4.80) for the non-surgical group. The overall mortality decreased by 61% in the surgery group (age adjusted hazard ratio 0.39, 95% CI 0.33–0.45) compared with the non-surgical group. After adjusting for prognostic factors (sex, coronary heart disease, valvular disease, cancer, hypertension, diabetes, heart failure, stroke, atrial fibrillation) the results persisted. The most common cause of death in the non-surgical group was cardiovascular disease, followed by cancer. In the surgical obese patients the most common cause of death was external causes of mortality (such as accidents and suicide), followed by cardiovascular disease and cancer. Although accidents and suicide were the main causes of death in the surgical group, the incidence of death from these causes was still lower than in the non-surgical group.

Conclusion: This population-based cohort study indicates that the overall all-cause mortality is considerably lower among obese individuals who undergo bariatric surgery compared to non-surgical obese individuals.

Reference:

1 Buchwald H, Oien DM. Metabolic/bariatric surgery worldwide 2011. *Obes Surg.* 2013;23(4):427–36.

Addictive-like eating behavior: Which are the most prevailing symptoms within the German population applying the YFAS 2.0?

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Background & Aims, Objectives: Some aspects of excessive eating behavior resemble addiction as classified by Diagnostic and Statistical Manual of Mental Disorders (DSM)-5 (1). This led to the hypothesis that there may exist a disease called 'food addiction' (FA). The criteria of DSM-5 used to determine an addiction were applied to the construct of FA. **Material & Methods:** The Yale Food Addiction Scale (YFAS) 2.0 measures addictive-like eating behavior based on the DSM-5 criteria for substance-related and addictive disorders (2, 3). In the present study the German version of YFAS 2.0 was used to investigate for the first time the prevalence of FA in a population sample, representative for the age group 18 – 65 years. A total of 1034 Germans completed a self-administered online questionnaire.

Results: Based on the YFAS 2.0, 7.9% received the diagnosis of FA. 6.2% received the diagnosis of severe, 0.8% of mild and 1.0% of moderate. A mild diagnosis was given for 2–3, a moderate diagnosis for 4–5 and a severe diagnosis for 6 or more symptoms plus respectively clinical significance. Mean amount of symptoms was 1.69 (SD 2.875). 8.5% showed clinical significant impairment, the decisive symptom to receive a diagnosis. Most frequently mentioned symptoms were 'loss of control (19.2%)', 'activities given up (18.9%)' and 'withdrawal (18.5%)' and least frequently mentioned was 'tolerance (7.4%)' (Table 1).

Conclusion: By simply using the instrument YFAS 2.0 it cannot be assessed whether an addiction named FA exists. Additionally the split into different degrees of severity should be called into question because of the low occurrence of mild and moderate FA. Further research is needed on this topic.

References:

1 Association AP. DSM-5 (vol 2013).

2 Gearhardt AN. Development of the YFAS 2.0 [in press].

3 Meule A. German version of the YFAS 2.0 [in press].

Acknowledgements: This research was funded by a research grant provided by Danone Institute Germany, Munich.

Table 1 to PO2.175. Frequency of fulfilled YFAS-food addiction-criteria (based on DSM-5) and body mass index.

YFAS-food addiction-criteria	Underweight n	Underweight %	Normal n	Normal %	Overweight N	Overweight %	Obese N	Obese %	Total N	Total %
Loss of Control	5	0.5	74	7.2	58	5.6	62	6.0	200	19.2
Unsuccessful cutdown	4	0.4	49	4.7	50	4.8	58	5.6	163	15.6
Time spent	4	0.4	45	4.4	29	2.8	42	4.1	121	11.6
Activities given up	6	0.6	77	7.4	53	5.1	59	5.7	197	18.9
Aversive consequences	5	0.5	42	4.1	35	3.4	49	4.7	133	12.7
Tolerance	2	0.2	26	2.5	20	1.9	29	2.8	79	7.4
Withdrawal	3	0.3	78	7.5	53	5.1	57	5.5	193	18.5
Interpersonal problems	6	0.6	74	7.2	53	5.1	56	5.4	191	18.3
Impaired daily functioning	4	0.4	76	7.4	47	4.5	52	5.0	181	17.3
Dangerous situations	4	0.4	73	7.1	53	5.1	59	5.7	191	18.3
Craving	3	0.3	43	4.2	31	3.0	37	3.6	116	11.0
Clinically significant impairment	3	0.3	27	2.6	18	1.7	40	3.9	90	8.5
Total	20		438		361		215		1034	

Distribution of 'Food Addiction' (FA) among the German population: A cross-sectional study using the YFAS 2.0 in a representative sample

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Some aspects of excessive eating behavior resemble addiction as classified by Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (1). Thus the question arises whether a disease called FA exists and how FA is distributed over Germany. The Yale Food Addiction Scale (YFAS) 2.0 measures addictive-like eating behavior based on the DSM-5 criteria for substance-related and addictive disorders (2, 3). In the present study the German version of YFAS 2.0 was used to investigate for the first time the prevalence of 'food addiction' (FA) in a population sample, representative for the age group 18–65 years. A total of 1034 Germans completed a self-administered online questionnaire. The phenomenon of FA was evenly distributed over the whole population, 7.9% received a diagnosis (mild + moderate + severe FA; Fig 1.). No significant correlations between demographic data (gender, education level, place of residence) and the number of endorsed symptoms occurred. However with body mass index ($r_s = 0.11$, $p < 0.001$) and with age ($r_s = -0.22$, $p < 0.001$) significant correlations were found. Prevalence of FA differed as a function of weight status ($\chi^2(3) = 34.61$, $p < .001$): Individuals with underweight (15%; odds: 3 times higher) and obesity (15%; odds: 3.5 times higher) were more likely to receive an FA diagnosis than those with normal weight (4%; reference value for calculation of odds) (Fig. 2). Based on YFAS 2.0 the phenomenon of FA is spread over the whole German population. Among underweight and obese people higher prevalence rates were found. However we must bear in mind that the construct of FA is not defined as an official disease in DSM-5 and should therefore not be over interpreted. 1. Association AP. DSM-5 (2013) 2. Gearhardt A. Development of the YFAS Version 2.0 [in press]. 3. Meule A. German version of the YFAS 2.0 [in press]. This research was funded by a research grant provided by Danone Institute Germany, Munich.

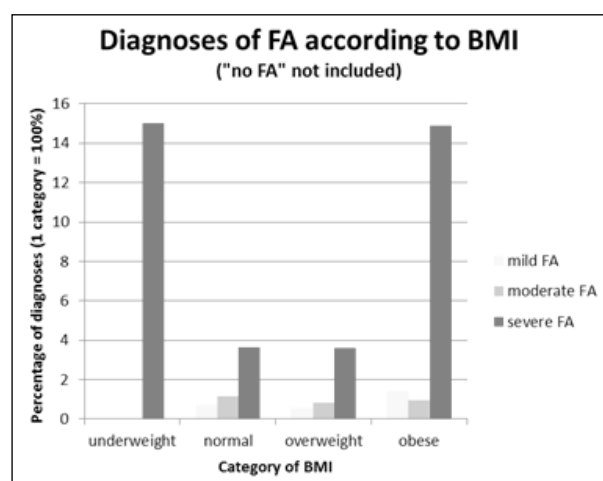


Fig. 1. Frequency of FA according to BMI

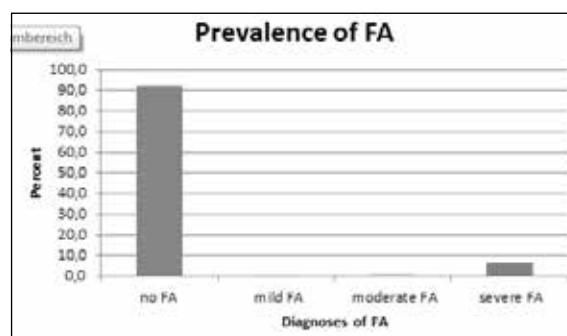


Fig. 2. Prevalence of food addiction (FA) within the German population

Endocrine disrupting polychlorinated biphenyls in metabolically healthy and unhealthy obese subjects before and after weight loss. Difference at the start, but not the finish

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Background: A subset of obese individuals does not exhibit metabolically unfavorable features, so-called metabolically healthy obese (MHO). Recently, serum levels of polychlorinated biphenyls (PCBs), chemicals with endocrine disrupting properties, have been found to be lower in MHO versus metabolically unhealthy obese (MUO). Objective We studied PCB serum levels during and after weight loss and their relation with metabolic health. Research

Design and Methods: We determined metabolic health features (weight, blood pressure, lipids, inflammation, glucose metabolism) and serum PCB levels of 27 PCB congeners in a cohort of 184 overweight and obese subjects. Metabolic health was evaluated using the criteria of the metabolic syndrome (MetS+ or MetS-) or extended criteria taking into account inflammation and insulin resistance (MUO vs MHO). Participants were treated with lifestyle counselling or bariatric surgery. A metabolic and toxicological re-evaluation was performed after 6 and 12 months in a subgroup of 71 individuals.

Results: At baseline, serum Σ PCB levels were significantly higher in MUO vs MHO (Σ PCBs 138 ± 105 vs 365 ± 481 ng/g lipid weight, $p = 0.01$), but not in MetS+ vs MetS- (Figure 1). No difference was detected in percentage increase in PCB serum levels in MetS+ vs MetS- (median 58% vs 43% and 31 vs 69% at 6 and 12 months respectively). Comparing persistent versus resolved MetS and MUO didn't reveal any difference in Σ PCB levels increment (median 49% vs 58% at 12 months for MUO, $p > 0.05$) (Figure 2). In a regression model correcting for age, smoking and body mass index, PCB serum levels at baseline were not predictive for the persistence or resolution of a metabolically unfavorable state.

Conclusion: This study indicates that, despite increased serum levels of PCBs during and immediately after weight loss, the increment in serum levels of PCBs does not differ according to metabolic health and does not seem to influence the beneficial metabolic health effects of weight loss

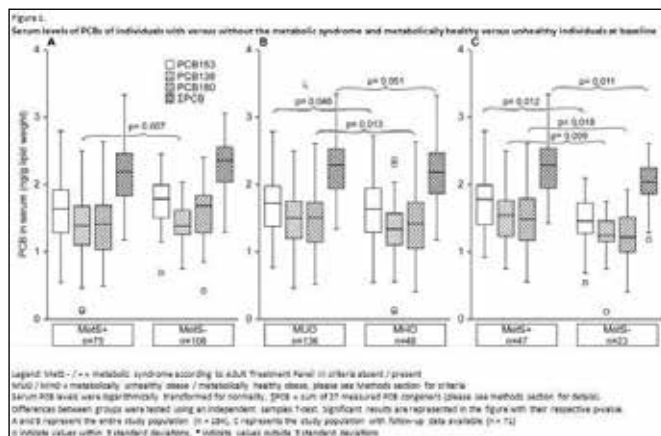


Fig. 1. DIRINCK EOS 2016

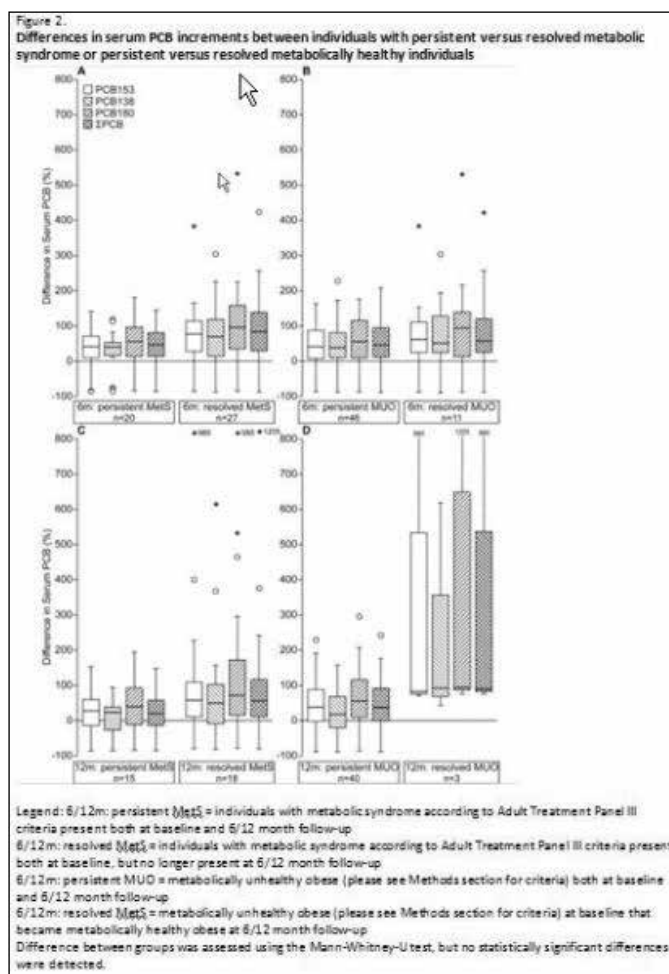


Fig. 2. DIRINCK EOS 2016

PO2.178

Beyond body fat, physical activity and energy: TV viewing is independently related to the shortening of leukocyte telomere length among Chinese adults

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Introduction: Leukocyte telomere length (LTL), as a potential indicator of cellular aging, predicted various age-related diseases and could be influenced by factors that could induce the oxidative stress and inflammation. Sedentary behavior (SB) has been suggested to be associated with increasing level of the oxidative stress and inflammation. However, only two studies have examined the association between SB and LTL. Moreover, no study has explored whether this association could be influenced by anthropometric index, physical activity or energy intake (EI) concurrently.

Methods: Data on SB (TV viewing, computer/mobile phone using), moderate-to-vigorous physical activity (MVPA) and dietary intake of 518 Chinese adults (54.3% women) aged 20–70 years were obtained by questionnaires. Body height, weight and skin-fold thickness were measured to calculate body mass index (BMI, kg/m²) and percent body fat (%BF). Terminal restriction fragment, as an indicator of LTL, was measured by Southern blot method. Multivariable linear generalized regression models were used to examine the association between SB and LTL.

Results: Time spent on TV viewing was inversely related to LTL after adjusting for gender, age, personal monthly income, smoking status, pressure, EI, MVPA energy expenditure and %BF (Estimate (SE): -70.8 (33.9), p = 0.04). Furthermore, the similar trend between LTL and TV viewing was found in 20–40 age groups after adjusted for all covariates (including EI, MVPA energy expenditure and %BF etc.). Adults aged 20–40 years in highest tertile of daily time spent on TV viewing had 7.0% shorter LTL than adults in the lowest tertile (p = 0.01). However, no significant association of computer/phone using with LTL was observed.

Conclusions: Time of TV viewing was inversely related to leukocyte telomere length among Chinese children, independent of energy intake, physical activity and body fat. *Corresponding author: Guo Cheng 1. Conflict of interest: None of the authors have any personal or financial conflicts of interest. 2. Funding: Research relating to this abstract was funded by research grant from National Natural Science Foundation of China (NSFC-81472976).

PO2.179

Weight-based discrimination: An ubiquitous phenomenon?

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Background: Despite strong indications of a high prevalence of weight-related stigmatization in individuals with obesity, limited attention has been given to the role of weight discrimination in examining the stigma obesity. Studies, up to date, rely on a limited basis of data sets and additional studies are needed to confirm the findings of previous studies. In particular, data for Europe are lacking, and are needed in light of a recent ruling of the European Court of Justice that addressed weight-based discrimination.

Methods: The data were derived from a large representative telephone survey in Germany (n = 3 003). The dependent variable – weight-based discrimination was assessed with a one-item question. The life-time prevalence of weight discrimination across different socio-demographic variables was determined. Logistic regression models were used to assess the association of independent and dependent variables. A sub-group analysis was conducted analyzing all participants with a BMI ≥ 25 kg/m².

Results: The overall prevalence of weight-based discrimination was 7.3%. Large differences, however, were observed regarding weight status. In normal-weight and overweight participants the prevalence was 5.6%, but this number doubled in participants with obesity class I (10.2%), and quadrupled in participants with obesity class II (18.7%) and under-weight (19.7%). In participants with obesity class III, every third participant reported accounts of weight-based discrimination (38%). In regression models, after adjustment, the associations of weight status and female gender (Odds Ratio: 2.59, p < 0.001) remained highly significant.

Conclusions: Discrimination seems to be an ubiquitous phenomenon at least for some groups that are at special risk, such as heavier individuals and women. Our findings therefore emphasize the need for research and intervention on weight discrimination among adults with obesity, including anti-discrimination legislation.

Acknowledgment: This study was funded by the Federal Ministry of Education and Research (BMBF), Germany, FKZ: 01EO1501.

PO2.180

Biliopancreatic diversion (BPD) in obese patients with diabetes mellitus type 2 (DM 2) and state of carbohydrate metabolism

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Aim: to review the metabolism of glucose in patients with obesity and DM 2 after BPD.

Methods: examined 70 patients, age 45.0 ± 8.4 years, with obesity (BMI 48.2 ± 7.3 kg/m²) and DM 2 before and during 5 years after BPD ($p < 0.05$).

Results: BMI during the year decreased from 48.2 ± 7.3 to 29.5 ± 4.7 kg/m² and remained stable by the end of the observation period (29.1 ± 4.0). Weight loss was accompanied by improvements in carbohydrate metabolism: 3 months marked normalization of fasting plasma glucose (baseline 8.0 [$7.1;10.9$] mmol/l, after 3 months – 5.6 [$5.0;6.0$] and HbA1c (baseline 7.5 [$6.6; 8.5$]%, after 3 months – 5.7 [$5.3;5.9$], which remained stable for over 5 years of follow up (4.5 [$4.0;4.5$] and 4.8 [$4.2;5.0$] respectively). Initially 45.4% of patients revealed fasting hyperinsulinemia (22.0 [$16.4;38.6$] U/l) and all patients – increasing HOMA-IR (9.3 [$6.2;17.3$]). After 3 months and during 5 years of observation fasting hyperinsulinemia was not detected in any patient, the number of patients with increasing HOMA-IR also decreased significantly: after 3 months the number of these patients was 25% , after 6 months – 15.4% , after a year there were no patients with increasing HOMA-IR.

Conclusion: in obese patients with DM 2 the weight decreased after BPD remained stable in the observation periods of up to 5 years, and accompanied by a significant improvement in the status of carbohydrate metabolism within 3 months after surgery; the status remains stable in observation periods of up to 5 years. Keywords: biliopancreatic diversion, obesity, diabetes mellitus

PO2.181

Reduced caloric intake relative to fat free mass in pregnancy compared with postpartum: Changes that favour efficient fat storage in pregnancy

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Background & Aims: Fat mass (FM) increases during pregnancy as a fuel for fetal development and breast-feeding, however excessive fat gain is related to poor maternal and neonatal outcomes. We have previously shown that increases in FM during pregnancy are not associated with significant increases in caloric intake (CI) suggesting improved caloric extraction from food due to changes in gut microbiota (1). It remains unclear whether CI relative to fat free mass (FFM) in pregnancy changes postpartum. **Objectives:** To compare changes in body composition, total energy expenditure (TEE) and CI in healthy pregnant women and women postpartum. **Methods:** Body composition, TEE and CI were measured longitudinally in 26 pregnant women in the 1st, 2nd and 3rd trimesters, and compared to 29 different women 6 months postpartum in a cross-sectional study. FM and FFM were measured using bio-impedance analysis, 24-hour TEE using the Sensewear Armband, and CI through a 3-day food-recall diary.

Results: Body weight, FM, % body fat and FFM all increased during pregnancy and decreased postpartum. TEE was not significantly different postpartum compared with pregnancy. CI did not change significantly throughout pregnancy but was higher postpartum versus 2nd trimester. CI per kg FFM was significantly higher postpartum compared to all three trimesters.

Conclusion: Healthy women increase FM during pregnancy despite no change in CI, and FM decreases postpartum despite an increase in CI relative to FFM. These findings suggest energy metabolism in pregnancy may be regulated by factors additional to those that usually control energy metabolism in the non-pregnant state.

Reference:

1 Abeysekera et al. Aust NZ J Obstet Gynaecol 2015 DOI: 10.1111/ajo.12398

Table 1. body composition and energy metabolism

Results: as mean \pm SD, *P < 0.05 vs 1st trimester, #P < 0.05 vs 2nd trimester, ∞ P < 0.01 vs 2nd & 3rd trimesters, §P <0.01 vs 3rd trimester

	1st trimester	2nd trimester	3rd trimester	Postpartum
Weight (kg)	67.3 \pm 14.1	73.0 \pm 13.9	78.1 \pm 13.8*	64.0 \pm 13.5 ∞
FM (kg)	23.3 \pm 9.0	27.0 \pm 8.9	30.3 \pm 8.5*	22.9 \pm 9.6§
Body fat (%)	33.7 \pm 6.0	36.2 \pm 5.5	38.2 \pm 4.3*	33.7 \pm 8.2§
FFM (kg)	44.0 \pm 6.2	46.0 \pm 6.2	47.9 \pm 6.0*	41.2 \pm 6.8 ∞
TEE (kJ/day)	9514 \pm 1497	10240 \pm 1872	10263 \pm 1296*	10135 \pm 1225
Caloric intake (kJ/day)	8649 \pm 2173	8171 \pm 2110	8637 \pm 2236	9514 \pm 2570#
Caloric intake/FFM (kJ/day/kg)	202 \pm 60	181 \pm 50	184 \pm 53	238 \pm 76* ∞

PO2.182

High frequency of binge eating disorder, weight variation and distress of body shape are common among men and women with severe obesity

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Background: It is important both for the obesity specialist and for the patient to acquire knowledge in specific areas such as eating pattern, weight history, previous weight loss attempts and attitude toward body shape that potentially can affect long-term outcome in obesity treatment. **Objective:** To analyse the prevalence of binge eating disorder (BED) according to DSM-IV criteria, weight history, previous weight loss attempts and body shape valued by the patients among obese patients admitted to an obesity unit.

Material/Methods: 1189 men and women, aged 45.8 ± 13.5 years, BMI: 41.7 ± 5.7 kg/m² admitted to the Obesity Unit at Sahlgrenska University Hospital between 2008 and 2015 completed the Questionnaire of Eating and Weight Patterns-Revised. Pearson's chi2-test (χ^2) was used to analyse differences between sexes.

Results: BED was reported among 11.1% (women) and 7.7% (men) (χ^2 11.7, $P < 0.01$). Fifty-one percent of the women and 19% of the men reported dieting in more than half of their adult life (χ^2 178.2, $P < 0.0001$). Among those who had lost 10 kg or more in weight, at least three times and relapsed thereafter were 56% women and 40% men (χ^2 46.1, $P < 0.0001$). During the last 6 months 10.5% of the women and 6.4% of the men (χ^2 8.8, $P < 0.01$) had used a structured weight loss program. 65% (women) and 38% (men) were very distressed and tormented by their body shape (χ^2 23.3, $P < 0.0001$). 70% of the women and 49% of the men

(χ^2 79.7, $P < 0.0001$) considered weight and body shape were among the most important parts in how they valued themselves.

Conclusion: Several potential barriers that may affect outcome of a weight loss treatment are very prevalent among adult severely obese patients. It is important that both the patient and the obesity specialist are aware of these potential treatment barriers and how the obese patient may be affected and can handle them to optimise and facilitate weight loss treatment.

PO2.183

Bone metabolism in obese men and women with metabolic syndrome

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Background: It was suggested that metabolic syndrome (MS) is an additional risk factor for osteoporotic fractures. The aim of this study was to evaluate the impact of metabolic syndrome on bone metabolism and the risk of osteoporotic fracture in obese men and women. Materials and methods The study involved 40 obese men and 40 women, divided into 2 subgroups: patients with simple obesity (20 men and 20 women); and patients with MS (20 men and 20 women). The serum levels of PTH, 25(OH) D3, CTX1, osteocalcin, FGF-23, total Ca and P were determined. Total absolute fracture risk was estimated using Fracture Risk Assessment Tool. The control group consisted of 15 normal body mass, healthy men and women in similar age.

Results: Obese women with MS have higher risk of osteoporotic fractures (3.0 vs. 1.6%; $p < 0.001$) and serum levels of phosphorus (1.8 vs. 1.12 mmol/l; $p < 0.001$) but lower of 25(OH)D3 (7.3 vs. 34.6 ng/ml; $p < 0.01$) than women with simple obesity. There were no differences in risk of osteoporotic fracture and other study parameters between men with simple obesity and MS. Women with MS had a lower serum CTX1 levels (0.27 ng/ml vs. 0.41 ng/ml;) than men.

Conclusions Metabolic syndrome does not influence bone metabolism parameters in both men and women. However, women with metabolic syndrome have lower serum 25(OH)D3 levels. Women, but not men with metabolic syndrome have higher 10-year absolute fracture risk than women with simple obesity.

PO2.184

The occurrence of depressive symptoms and visceral obesity in adults

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Introduction: Numerous studies have been shown an increased incidence of depression in obese subjects. It has also been found that the weight gain is associated positively with the severity of depressive symptoms. However, the lack is data assessefd the influence of visceral fat distribution on the symptoms of depression. Therefore, the aim of this study was to evaluate the prevalence and severity of depressive symptoms depending on the visceral obesity occurrence.

Material/Methods: 744 adults subjects (452 women, 292 men aged 35.9 ± 12.4 years), including 21 underweight, 326 normal weight, 221 overweight and 176 obese subjects, were enrolled. Waist circumference was measured and visceral obesity was diagnosed according to the International Diabetes Federation (IDF) guidelines. The depression occurrence was determined using Beck Depression Inventory (BDI).

Results: 290 women (64.1%) and 130 men (44.5%) was diagnosed with visceral obesity. In women diagnosed with visceral obesity the prevalence of depression symptoms was significantly frequent than in group without visceral obesity ($\chi^2 = .036$, $p < 0.05$). However, the prevalence of depression symptoms in men with and without visceral obesity was similar ($\chi^2 = .855$, $p = 0.1$). There was positive correlation between waist circumference and depression symptoms levels ($r = 0.19$; $p < 0.05$) and in both women ($r = 0.28$; $p < 0.05$) and men ($r = 0.17$; $p < 0.05$).

Conclusions: Visceral obesity affects the incidence of depressive symptoms in women. However, the impact of obesity on the severity of depressive symptoms appears to be independent of sex.

PO2.185

Associations of Vitamin D Receptor Polymorphisms with Obesity in Qatar

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Background & Aim: Previous studies were performed to find the relation between BsmI (rs1544410), ApaI (rs7975232) and TaqI (rs731236) polymorphisms in VDR gene with obesity. However, in the Arabian area few studies regarding this relation were performed [1]; thus this study aimed to find the relation between VDR gene polymorphisms by BsmI, ApaI and TaqI and obesity among young Arabian females in Qatar University.

Objectives: The primary objective was to investigate an association between the genotypes of VDR gene within the three SNPs with different obesity indicators including BMI, waist circumference (WC) and percent body fat (%BF). To achieve this objective, it was necessary to study the genotypic distribution for the three SNPs among both case and control subjects. The minor objective was to assess the relation between vitamin D level and different obesity indicators.

Material/Methods: In this study, 142 young female subjects from Qatar University were recruited and classified into 88 control subjects and 54 overweight/obese subjects. Anthropometric measurements were performed using body composition analyzer. Blood samples were used to analyze polymorphisms by three SNPs BsmI, ApaI and using TaqI TaqMan assay and RT-PCR. Additionally, vitamin D level was measured using ELISA technique.

Results: TaqI showed a deviation from Hardy- Weinberg equilibrium, so it was excluded from the study. The results showed three main findings. Minor allele (A) carriers for BsmI in VDR gene have significantly higher BMI, WC and %BF values with p-values of 0.009, 0.015 and 0.04 respectively. It was also found lower vitamin D levels were associated with increased WC with a p-value of 0.048 and 95% CI of (1.01–9.63). While insignificant association between ApaI and obesity indicators was found.

Conclusion: Obesity indicators including BMI, WC and %BF were significantly higher in individuals carrying the minor allele (A) for BsmI (rs1544410); suggesting the potential relation of VDR polymorphism with obesity in Qatar.

Reference:

Al-Daghri, Nasser M., et al. "Vitamin D receptor gene polymorphisms are associated with obesity and inflammosomal activity." (2014): e102141.

Acknowledgements: Thanks to our supervisors Dr. Elham Sharif and Dr. Nasser Rizk Assistant professors in Biomedical sciences at Qatar University.

PO2.186

Smoking status and nutritional status in adults

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Introduction: Smoking and obesity are main problems of public health. Previous studies have suggested relation between both these problems. Quitting smoking is considered as a significant risk factor for weight gain. However, the integration between smoking status in the population is still

unclear. The aim of present study was to assess association between body mass and smoking in adults.

Material/Methods: 744 adults (452 women, 292 men, aged 35.9 ± 12.4 yrs), including 21 underweight, 326 normal weight, 221 overweight and 176 obese subjects, were enrolled. In addition to anthropometric measurement data about smoking was collected.

Results: 31.3% respondents have smoked, mean 15 ± 8 cigarettes per day. Duration of the addiction was 16.6 ± 11.1 yrs. Among non-smokers 30.8% have smoked in the past for 11.4 ± 9.6 yrs. There were no association between nutritional status and smoking status, regardless of gender. In men but no in women there was a significant correlation between amount of cigarettes smoked per day and BMI ($r=0.30$; $p < 0.01$). There was no correlation between duration of smoking and BMI, both in women and in men. The weight gain after quitting of smoking was similar in women and in men.

Conclusion: Nutritional status is not related to smoking and smoking duration in women and in men. However, it seems that the number of cigarettes smoked per day may be a factor associated with nutritional status.

PO2.187

Psycho-social issues and children's obesity: Sri Lankan Experience

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Children's obesity is an emerging health and social issue in Sri Lanka. The prevalence of overweight/obesity among children aged 5 to 15 in Sri Lanka is about 13%. The objective of this paper is to identify psycho-social issues faced by 156 obese children and their parents randomly selected from a nutrition clinic at the Lady Ridgeway Hospital (LRH) and five schools in Colombo Municipality. Data collected through an interviewer-administered-questionnaire and focus group discussions. SPSS and thematic analysis methods were employed for analysis. Children who were BMI-Z $> +1$ were regarded overweight and obese. 70% of the sample was boys. Median aged was 9 years. The mean BMI-Z score was 2.3. 53% belonged to the upper middle class and were the Sinhalese ethnicity. Dissatisfaction about the body image and beauty and teasing and bullying by peers at school were the main psycho-social problem faced by the obese children. Obese children being lazy and tired are subjected to ridicule by fellow children resulting in their social isolation and low self-esteem. The parents are concerned that they find difficult to purchase clothes matching their children's body size. Moreover, parents are worried about such children's poor interest in education and future health risk. Some ridiculous terms used to tease were culturally significant words that denote ugly gigantic animals found in folklore, culture and TV cartoons. Such bullying and teasing are found within families as well. The findings show that due to such bullying and teasing children with obesity suffer psycho-social distress. Such distress impacts on their overall quality of life and emotional well-being. Weight based teasing and bullying by peers have considerable impact on damaging growing self esteem of the youngsters and negatively impact on their social integration with the mainstream society. Recommendation of the study includes provision of community or school based advocacy programmes and psycho-social support services to address such emotional issues of obese children in addition to taking action to control childhood overweight/obesity from a younger age.

PO2.188

Body image dissatisfaction in individuals with obesity compared to normal-weight individuals: A systematic review and meta-analysis

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Background: In light of its detrimental effect on public health systems in general as well as on affected individuals' quality of life in particular, substantial parts of obesity research have focused on starting points for interventions and preventive measures. Body image dissatisfaction has been identified as a psychological correlate of obesity that is related to disordered eating, poor self-esteem and even depression. Considering western society's emphasis on thinness, it is not surprising that obese persons experience adverse psychosocial consequences. With not all individuals with obesity being equally vulnerable to this problem and "normative discontent" with one's body, striking normal-weight individuals as well, further research into the complex relationship of body image and individual weight status seems worthwhile. As such, this review aims to systematically explore the degree body image dissatisfaction of obese compared to normal-weight individuals.

Methods: A systematic literature search was conducted. All quantitative studies of adult samples reporting results regarding differences in body image dissatisfaction between individuals with normal-weight and obesity not enrolled in weight-loss interventions were included.

Results: Twenty articles were found. The reviewed studies relied on different methods to assess body image dissatisfaction: Subjects either completed self-report questionnaires (e.g. Multidimensional Body-Self Relations Questionnaire (MBSRQ), Body Shape Questionnaire (BSQ)), or chose silhouettes representing how they would like to look (ideal) and how they currently look (current). Body dissatisfaction was then measured by calculating the difference between ideal and current silhouette, with greater discrepancies indicating greater dissatisfaction. Three studies made use of both methods. Across the studies, obese individuals reported higher body image dissatisfaction than normal-weight individuals.

Conclusions: Implications of these findings are discussed. Future research should further examine differences between normal-weight and obese individuals regarding other aspects of body image like for example body image perception.

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PO2.190

Level 3 specialist weight management clinic in Wales: Service evaluation

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Background & Aims: The obesity pandemic presents a major challenge to healthcare professionals worldwide. Level 3 Specialist Weight Management Service is designed to provide a more individualised and multi-faceted approach to specialist obesity care. The evidence supporting its effectiveness remains limited. We sought to evaluate the service delivered by a multidisciplinary team established in South Wales.

Objectives: To assess the effectiveness of a Level 3 Specialist Weight Management Clinic offering the expertise of a bariatric physician, specialist dietitian, cognitive behavioural psychotherapist, and bariatric nurse based at Aneurin Bevan Hospital, Aneurin Bevan NHS Health Board, UK. **Material & Methods:** We performed a retrospective analysis of all available

patient records seen between November 2007 and January 2015. Overall outline of patients' demographics was assessed. The primary outcomes were absolute and percentage weight loss of $\geq 5\%$ and $\geq 10\%$ at 6, 12 and 24 months. Using multivariable regressions models, predictors of these outcomes were identified.

Results: 225 cases were included, mean age was 49.7 years, 71.6% were female, mean weight at baseline was 138.7 kg and mean BMI was 49.8 kg/m². 83.1% of patients had class III obesity with BMI ≥ 40 kg/m². 82.5%, 82.4% and 78.6% of patients lost weight at 6, 12 and 24 months respectively. Mean cumulative weight reduction at 6, 12, and 24 months was 7.2kg (5.1%), 8.8kg (6.2%), and 9.7kg (6.7%). 45.3%, 51.7%, and 54.8% of patients lost $\geq 5\%$ body weight at 6, 12 and 24 months. 19%, 31.9%, and 23.2% lost $\geq 10\%$ body weight at 6, 12 and 24 months. Older age, distance travelled from home to the clinic, presence of lymphoedema and more frequent appointments with the clinic's bariatric physician were associated with better outcomes.

Conclusion: Level 3 services provided by the Aneurin Bevan Hospital multidisciplinary team is a sustainable model for managing severe and complex obesity. Its effectiveness compared favourably with existing literature. A standardised approach to this service evaluation across the UK and further research into optimal intervention measures are warranted.

PO2.191

The Impact of Myeloperoxidase Enzyme MPO in Obesity and Insulin Resistance

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Background: Obesity is characterized by a low- grade inflammatory condition, which connects it to the immune system, specifically the adaptive immunity. However, not much is known about the relation between the innate immunity and obesity. Neutrophils, which are the most important component of the innate immune system, are thought to be activated in obese subjects. This activation leads to the degranulation of neutrophils and the release of several enzymes including Myeloperoxidase enzyme (MPO). The main aim of this study is to reveal the association between obesity and MPO.

Method: A cross-sectional study was performed on 53- female students from Qatar- University. The subjects were classified according to the BMI cut-off values provided by the World Health Organization into two groups: "overweight/obese; n = 25" and "lean; n = 28". Anthropometric measurements were assessed and calculated for BMI and waist circumference (WC). Venous blood samples were collected for the analysis of several related biochemical markers such as glucose, and lipid profile. ELISA assay "Quantikine ELISA Human Myeloperoxidase Immunoassay; R&D systems a biotechnie brand" was performed to measure the serum concentrations of MPO in the two groups. In addition, flowcytometry assay was conducted on fresh blood samples using (BD LSRFortessa TM Cell Analyzer) to analyze the neutrophils activation pattern in all study subjects. The MPO level was evaluated according to the BMI and the waist circumference, as indicators of obesity. Insulin was measured by Elisa, and HOMA-IR was calculated for insulin resistance.

Results: No significant relationship was found between MPO level and BMI ($r^2 = 0.039$, $P = 0.159$). However, there was a significant relationship between MPO level and WC ($r^2 = 0.068$, $P = 0.050$). Subjects with high WC measurements have significantly higher values of MPO (29.54 (19.52- 39.57)) than subjects with normal WC (29.54 (19.52-39.57)); with a P- value of = 0.048. In addition, the neutrophils activation is significantly associated with MPO level ($r = 0.369$, $P = 0.032$). However, the MPO level was insignificantly correlated with HOMA-IR ($r = 0.085$, $p = 0.203$).

Conclusion: Visceral obesity, indicated by high WC measurement, is associated with increased level of MPO. This may explain the associated metabolic and vascular complications of visceral obesity.

PO2.192

Older Carer's Experience in Supporting a Weight Loss Programme for Adults with Intellectual Disability (ID) who are Overweight or Obese

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Background. Studies consistently suggest that people who have intellectual disability and are obese are greater in number than comparable groups within the general population. Aim. To gain an insight of the lived experience of older carers in supporting young adults participating in a multi-component weight loss programme.

Method: 15 carer semi-structured tape-recorded interviews were completed and using Nvivo data analysis tool. It is essential to involve carers in research about those they care for in order to find out what works and what doesn't work in relation to achieving weight reduction interventions (Equal Lives Report, Department of Health and Social Services and Public Safety, 2005).

Findings: The older carers reported being 'exhausted & exasperated' in completing daily food charts despite taking part in their 'user friendly' development. They further highlighted an increase in their own 'anxiety and depression' as a result of implementing the programme necessitating in the withdrawal of their support for it. "I've had enough – she has become OCD and thrown out my frying pan and any food that says 'fat' on it. I can't stick it anymore".

Conclusion. Older carers 'initial intentions' were admirable in their endeavour to support weight loss programmes. However, 'sustainability' had a major impact on the health resulting in an unavoidable acceptance in the status quo. "Isn't he better fat and sitting on a seat in his own home with me – than slim and stuck in one of those nursing homes running about – this programme is driving me mad!"

PO2.193

Pre-bariatric surgery psychological evaluation: Assessing beliefs about surgery

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Background: Many studies have surveyed psychological assessment protocols used for evaluating bariatric surgery candidates. Although mental health practitioners generally conduct a clinical interview and administer various measures including self-report and objective measures in their assessment protocol, review of the literature does not reveal a standardized psychological protocol or battery. The psychological assessment usually includes a clinical interview which addresses motivation for surgery, weight/diet history, eating behaviors, psychiatric history (including alcohol and substance abuse), and support network. In addition to the clinical interview, psychological testing is often administered to acquire objective information. However, the bariatric surgery candidate's underlying beliefs and expectations of surgery are not generally emphasized. The purpose of this study was to explore candidate specific beliefs about how surgery would effect stress and overeating.

Method: The participants were 28 female and one male candidates ages 25 to 67 who presented for a pre-bariatric surgery psychological evaluation. As part of their psychological assessment protocol, participants completed a bariatric surgery questionnaire which included beliefs about surgery's effect on overeating and stress.

Results: The results revealed that 21.4 percent of candidates believed that surgery would change how they react to stress, 53.5 percent believed that surgery would enable them to stop eating as soon as they were full and 28.5 percent believed that they would be unable to overeat after having weight loss surgery.

Conclusions: A notable percentage of bariatric surgery candidates believe that surgery will stop them from eating when full, prevent them from

overeating and change how they react to stress, all of which are inaccurate beliefs and expectations of surgery. These results suggest that it is critical for mental health practitioners to assess patient beliefs in their psychological evaluations so that inaccuracies can be identified and addressed prior to surgery. This will afford patients the opportunity to obtain appropriate expectations and accurate understanding of surgery and its limitations, therefore enhancing a greater sense of personal control and responsibility for a long-term positive outcome.

Table 1. Selected Items from Bariatric Surgery Questionnaire
Percentage of patients who responded "True".

1. Surgery will change how you react to stress.	21.42%
2. Weight loss surgery will enable an individual to stop eating as soon as he/she is full.	53.57%
3. You will be unable to overeat after you have weight loss surgery.	28.57%

PO2.194

The prevalence of non-alcoholic fatty liver disease (NAFLD) during cadaver autopsy in the department of legal medicine in Kerman on 2013

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Introduction: Fatty liver is a multi-factorial gastrointestinal disorder that can lead to different disease and finally death. It is mostly silent without any obvious symptoms. This study is designed to determine the prevalence fatty liver after cadaver autopsy in 102 cadaver and its correlation with associated risk factors.

Methods: Liver autopsy was done on 102 cadaver refereeing to the legal medicine ward of Kerman on 2013. Clinical information and pathologic findings were recorded in statistical checklist. Finally data were analyzed with fisher's exact test and mann-whitney U statistical test in SPSS environment ver.20

Results: Mean of age was 43.25 ± 4.25 Pathologic findings showed 18(17.64) fatty liver. None of risk factors showed a significant relation with the prevalence of fatty liver ($P > 0.05$).

Conclusions: According to the finding and based on similar scientific evidences fatty liver in this study has higher prevalence rate in compared with other studies and more detailed study with larger sample sizes is recommended for more accurate findings.

PO2.195

Attitude of an adolescent population in 1996 to their body image, body weight compared with data ENSANUT 2012

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Today young adolescents who attend school have adopted a tendency to a surreal image mainly fostered by print and media, distorting their own image. The objective was to evaluate the information obtained in 1996, of the attitude of teenagers towards their body image and compare with the current data of obesity and overweight. In this study, 329 adolescents who attend second and third grade of high school in the city of Puebla, were surveyed to learn about their eating habits and their perception of weight and body image. The population had an average age of 17.39 ± 0.90 years, almost all men and women, were within the weight according to their BMI (men 22.03 ± 2.98 and women 21.56 ± 2.59). One thing to

note is that most of the adolescents (57%) did not perform any exercise daily, but used to do it at least three times a week, also had a clear acceptance of his physical appearance and emphasize its grooming as well as its power and self-esteem. Also, to the question what do you do to feel good about yourself, the response was to do some exercise or physical activity, which contrasts sharply with the situation observed in 2012. The data obtained in this study show significant difference with the data obtained by the ENSANUT (National Nutrition and Health Survey) 2012, the clear differences with the current adolescent obesity is a question to be solved. Adolescence is a stage where the foundations of eating behavior with good eating habits and body image relationship which shall prevail in wrong or right way as adults are formed.

PO2.196

Quality of life and bariatric surgery: A systematic review of short and long term results and comparison with community norms

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Objectives: Currently the effects of bariatric surgery are generally expressed in Excess Weight Loss (EWL) or comorbidity reduction. Therefore the aim of this review was to provide insight in the available prospective evidence regarding the short and long term effects of bariatric surgery on QoL and a comparison with community norms.

Methods: A systematic multi-database search was conducted for 'Quality of Life' and 'Bariatric surgery'. Only prospective studies with QoL before and after bariatric surgery were included. The 'Quality Assessment Tool for Before-After Studies with No Control Group' was used to assess the methodological quality.

Results: Twenty-eight studies met the inclusion criteria. Most studies were assessed to be of 'fair' to 'good' methodological quality. Ten different questionnaires were used to measure QoL. Follow-up ranged from 6 months to 10 years, sample sizes from 26 to 1276 and follow-up rates from 45% to 100%. A significant increase in QoL after bariatric surgery was found in all studies ($p \leq 0.05$), however mostly these outcomes stay below community norms. Only outcomes of the IWQOL, SF-36 and OWQOL show QoL outcomes that exceed community norms.

Conclusion: The Quality of Life is increased after bariatric surgery on both the short and long term. However, due to the heterogeneity of the studies and the generality of the questionnaires it is hard to make a distinction between different surgeries and difficult to see a relation with medical profit. Therefore, tailoring QoL measurements to the bariatric population is recommended as the focus of future studies.

PO2.197

A recent approach to ghrelin level after bariatric surgery

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Ghrelin and leptin, appetite hormones that directly affect food intake, bodyweight and energy regulation, play a key role in cognitive function (1). Ghrelin is a peptide that leads food intake and stimulates appetite, which is released by X/A-like cells in oxyntic glands from the fundus of the stomach and proximal small intestines, which consists of 28 amino-acids and regulates both short and long term food intake. Ghrelin and variations in ghrelin receptor genes are related to eating behavior, obesity and appetite, fasting insulin and insulin resistance and also blood triglyceride levels (2). Obesity results from the chronical unbalance between energy intake and expenditure, depending on genetic, environmental and hormonal circumstances (3). While obese individuals have a lower fasting ghrelin, when compared to normal individuals, postprandial ghrelin suppression decreases substantially (2). Bariatric methods results in weight loss by decreasing insulin resistance and improving glucose metabolism

(3). Different bariatric methods affect ghrelin levels differently (3). While some of the studies on plasma ghrelin levels after bariatric surgery have determined an increase in fasting ghrelin levels (4), some other studies indicate vice versa (5). Excision of most of gastric fundus causes a decrease in ghrelin production in a short period after the surgery. A study evaluated the ghrelin levels for 6 to 12 months after sleeve gastrectomy, which is a type of bariatric surgery applied to obese patients. Results: indicate that ghrelin levels after 6 months is lower than one year period (6). Further studies are required to determine the role of ghrelin in success of bariatric and metabolic surgery.

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Clinical Management II

PO2.199

Weight loss, blood pressure, pulse, and circadian patterns with prolonged-release naltrexone /bupropion combination therapy for obesity

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Adverse cardiovascular (CV) responses, e.g. increased blood pressure (BP) and pulse, or changes in BP circadian rhythms are areas of concern for drug development as they may be associated with an increased risk for CV events. Combination prolonged-release naltrexone/bupropion 32 mg/360 mg (NB) is approved for weight management in the US and EU. The effects of NB on body weight in subjects who were obese or overweight (BMI 27–45 kg/m²) were assessed in a placebo (PBO)-controlled, 56-wk, phase 3 study (N = 1496; randomized to 2:1 NB or PBO). Wk 56 weight loss was 6.4% NB vs 1.2% PBO ($p < 0.001$). NB-treated subjects also had greater improvements in waist circumference, lipids, and hsCRP vs. PBO ($p < 0.05$). A substudy (NB, N = 121; PBO, N = 59) was conducted in which subjects underwent 24-h ambulatory BP measurements (ABPM) at baseline, Wk 24, and Wk 52. Baseline characteristics included mean age 44 y, 86% female, 84% white, and mean BMI 36 kg/m². The Wk 52 weight loss was 7.5% NB vs 2.6% PBO ($p < 0.001$), consistent with the parent study. In both groups, BP was essentially unchanged from baseline and greater reductions in BP were observed with greater weight loss. In the ABPM substudy, the means of the 24-h ABPM at baseline for SBP were 121.2 (NB) and 122.0 (PBO) mmHg; for DBP they were 72.9 (NB) and 73.4 (PBO) mmHg. Mean changes from baseline to Wk 52 in 24-h BP and pulse were: NB: -0.2 mmHg SBP, +0.8 mmHg DBP, +0.1 bpm; PBO: -2.8 mmHg SBP ($P = 0.08$ vs NB), -2.1 mmHg DBP ($P < 0.01$ vs NB), -0.5 bpm ($P = 0.64$ vs NB). Comparison of average day and night SBP and DBP showed that normal circadian patterns were maintained with NB (Figure 1). NB's adverse event (AE) profile was consistent with its individual components; the most common AEs for this substudy were nausea, constipation, headache, and dry mouth. NB was associated with small baseline to endpoint BP and pulse changes, with maintenance of normal 24-hr circadian patterns over 1 yr of treatment.

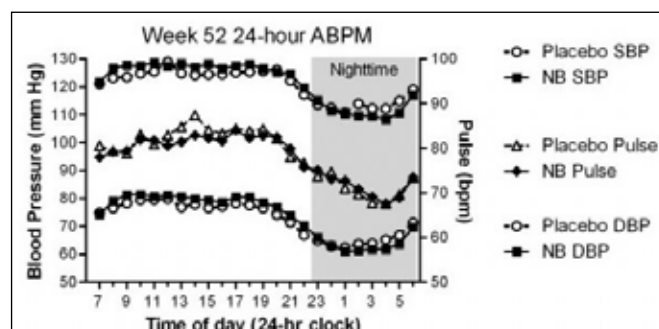


Fig. 1.

PO2.199

Comparison of Clinical Effectiveness of Bariatric Surgery for Obesity: Mid-term results from a Single Centre in the UK

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Background & Aims: Bariatric surgery is shown to be clinically effective in moderate to severely obese patients when compared to non-surgical interventions. Among the commonly performed bariatric procedures, the Laparoscopic Roux-en-Y Gastric Bypass (LRGB) is considered the gold standard with sustained long term results. Other relatively new procedures such as the Laparoscopic Adjustable Gastric Band (LAGB) and Laparoscopic Sleeve Gastrectomy (LSG) are gaining popularity and wide acceptance. This study aimed to compare the mid-term effectiveness results of the above 3 procedures (offered to eligible patients in an NHS Hospital in the UK) in improving morbidity associated with obesity.

Material/Methods: Retrospective analysis of a prospectively maintained database was undertaken to include all consecutive bariatric procedures since 2010. Patients with at least 2 years follow-up in designated bariatric clinics were included. At each visit patient's weight, BMI, excess body weight loss (EBWL), and ongoing co-morbidities were recorded. Improvement in exercise tolerance was ascertained by patient reported stair-climbing ability.

Results: A total of 353 patients were included in the analysis (75% Women). 65 (18.4%) patients underwent LAGB; 70 (19.8%) LSG and 218 (61.8%) LRGB. The median (i.q.r) age was 51.3(41.3–60), 46.3(36.3–53.8) and 42.3(33.6–49.1) years respectively. At presentation, the median weight was 139.8 (127.5–162.2), 142.5 (131.9–158.9), 139 (125.7–150.3) kilos $p = 0.077$; and 52 (48–55), 50.1 (47.4–54.3), 50.3 (46.8–53.3) kg/m² respectively $p = 0.069$. Percentage EBWL at the end of 1 and 2 years was significantly higher for the LRGB group – median (i.q.r) 67.3% (57.5–79.8) and 68.5% (57.5–84) respectively $p < 0.001$. At 2 years post-op, complete diabetes remission was significantly higher in the LRGB group 42/80 (52.5%) $p < 0.001$. Similarly exercise tolerance had significantly improved in the LRGB group with a median 3 flights of stair-climbing possible at the end of 2 years $p = 0.001$. There was no significant difference between the groups in remission of Hypertension $p = 0.380$; Dyslipidemia $p = 0.137$, Asthma $p = 0.165$; Gastro-oesophageal reflux disease $p = 0.579$ and Depression $p = 0.712$.

Conclusion: The mid-term results for weight loss and resolution of obesity related co-morbidities is in favour of RYGB. Long-term comparative results would help both surgeons and patients to make informed choices on the preferred type of treatment.

Sustained weight loss and metabolic improvements in 248 obese hypogonadal men treated for 8 years with injectable testosterone undecanoate (TU) compared to 123 untreated controls: Real-life data from a controlled registry study

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Background: Our group has previously reported sustained weight loss in obese hypogonadal men upon long-term testosterone therapy (TTh).

Methods: In a controlled registry study of 656 hypogonadal men in a single urologist's office, 371 (56.6%) were obese. Mean age: 61.3 ± 6.2 years. 248 men received TTh (T group) with TU 1000 mg/12 weeks following an initial 6-week interval for up to 8 years. 123 men had opted against TTh and served as controls (CTRL). Mean changes over time between the two groups were compared by a mixed effects model for repeated measures with a random effect for intercept and fixed effects for time, group and their interaction. Changes were adjusted for age, weight, waist circumference, fasting glucose, blood pressure, and lipids to account for baseline differences between groups.

Results: Weight (kg) decreased from 112.6 ± 11.1 to 90 ± 7.7 in the T group ($p < 0.0001$) and from 101.6 ± 6.3 to 100.3 ± 4.6 in CTRL (NS), model-adjusted estimated difference between groups at 8 years: -22.8 ($p < 0.0001$). Waist circumference (WC; cm) decreased from 109.7 ± 7.2 to 99 ± 6.1 in the T group ($p < 0.0001$) and from 112.8 ± 5.8 to 112.3 ± 5 in CTRL ($p < 0.01$), difference between groups at 8 years -13.5 ($p < 0.0001$). Mean weight change was -19.97 ± 4.97% in the T group ($p < 0.0001$) and +1.01 ± 2.83% in CTRL ($p < 0.01$), difference between groups: -21.2% ($p < 0.0001$). Fasting glucose (mmol/L) decreased from 5.76 ± 0.74 to 5.23 ± 0.05 in the T group ($p < 0.0001$) and from 5.65 ± 0.4 to 5.56 ± 0.33 in CTRL (NS), difference between groups: -0.44 ($p < 0.0001$). HbA1c decreased from 7.26 ± 1.37 to 5.61 ± 0.46% in the T group and increased from 6.53 ± 1.21 to 6.93 ± 1.54% in CTRL, difference between groups: -1.65% ($p < 0.0001$ for all). Lipid pattern improved in the T group and worsened in CTRL. Both systolic and diastolic blood pressure improved in the T group and remained stable in CTRL. No patient dropped out.

Conclusions: Long-term TTh with TU in obese hypogonadal men resulted in reductions in weight and WC, improvements in glycaemic control, lipid pattern and blood pressure. Untreated controls showed stability or modest increases in anthropometric parameters and blood pressure but deterioration of glycaemic control and lipid profile. The necessity to administer TU in the doctor's office guarantees full medication adherence.

Table 1. Metabolic changes in testosterone-treated patients vs. controls

T group = testosterone group; CTRL=control group; TC=total cholesterol; TG=triglycerides; SPB=systolic blood pressure; DBP = diastolic blood pressure; CRP = C-reactive protein

	T group baseline	T group 8 years	CTRL baseline	CTRL 8 years	model-adjusted estimated difference
TC (mmol/L)	7.6 ± 0.92	4.79 ± 0.2	7.22 ± 0.9	7.55 ± 0.87	-2.95
HDL (mmol/L)	1.53 ± 0.45	2.03 ± 0.47	1.16 ± 0.6	1.44 ± 0.8	0.48
LDL (mmol/L)	4.49 ± 0.93	2.77 ± 0.82	4.4 ± 1.46	5 ± 1.2	-1.82
TG (mmol/L)	3.28 ± 0.51	2.13 ± 0.09	3.27 ± 0.52	3.37 ± 0.61	-1.21
TC:HDL ratio	5.45 ± 2.03	2.51 ± 0.63	8.05 ± 4.06	7.1 ± 3.71	-4
SBP (mmHg)	156.89 ± 15.53	130.76 ± 6.93	141.27 ± 17.2	141.64 ± 12.68	-29.29
DBP (mmHg)	93.84 ± 11.18	74.78 ± 4.82	80.24 ± 9.19	80.95 ± 8.89	-18.37
CRP (mg/dl)	3.52 ± 4.24	0.22 ± 0.45	1.15 ± 1.17	1.51 ± 1	-2.1
BMI (kg/m ²)	36.08 ± 3.53	29.04 ± 2.6	32.76 ± 2.07	32.5 ± 1.45	-7.04

PO2.201

Non-invasive indexes for non-alcoholic fatty liver disease (NAFLD) and Metabolic Syndrome prediction

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Background: Liver steatosis in the absence of relevant alcohol intake (non-alcoholic fatty liver disease, NAFLD) is often associated with obesity, insulin resistance and hypertriglyceridemia. The main risk factors for NAFLD are also the same components of Metabolic syndrome (MS); observations suggest that NAFLD may develop independently of MS or even predict it [a]. The "Fatty Liver Index" (FLI) and the "Lipid Accumulation Product" (LAP) are continuous indexes and predict ultrasonography liver steatosis [b]. The present study aimed to test and compare the performance of LAP and FLI indexes by evaluating which algorithm can predict more accurately the occurrence of MS in overweight/obese subjects.

Materials & Methods: We enrolled 405 overweight/obese subjects (112M/293F; aged 15–82; mean BMI: 33.6 Kg/m²) attending two different outpatients units, the "Obesity and Work" outpatient one of the Clinica del Lavoro "L. Devoto" at Policlinico of Milan (Italy) and the "Dietetics and Clinical Nutrition Laboratory" at Pavia University (Italy). Thirty-two percent of them were diagnosed with MS, according to the International Diabetes Federation Guidelines. FLI was based on BMI, waist circumference (WC), fasting triglycerides (TG), and gamma-glutamyl-transferase (γ-GT); LAP was calculated from WC and fasting TG. Sensitivity, specificity and cut-off points of FLI and LAP were evaluated by both Receiver Operating Characteristic (ROC) analyses and area under the ROC curve (AUC).

Results: Both FLI and LAP showed a good accuracy to predict the occurrence of MS (AUC 0.74; 95% I.C.: 0.675–0.795; sensitivity 70.7%; specificity 72.8%; and AUC 0.82; 95% C.I.: 0.776–0.863; sensitivity 78.7%; specificity 73.3%, respectively). Comparing the two ROC curves, LAP AUC was significantly higher than FLI AUC ($p = 0.02$).

Conclusion: Although both FLI and LAP reported a good accuracy, LAP was the best algorithm to detect the presence of MS in overweight/obese subjects. LAP is a non-invasive prediction index that may be used to identify overweight/obese patients with MS both for clinical or for research purposes.

References:

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PO2.202

Correlation between metabolic syndrome and serum concentrations of vitamin D in Brazilian obese individuals class III in pre-operative to bariatric surgery: Sleeve gastrectomy and roux-en-y gastric bypass

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Background & Aim: In extreme obesity, bariatric surgery occurs as a mean of weight control, improvement of quality of life, correction of obesity-associated diseases and reduction of mortality. Also, nutritional deficiencies are common and inverse correlations between vitamin D serum concentrations and increasing adiposity, risk of metabolic syndrome (MS) or incidence/severity of MS components occur. Our aim was to characterize the nutritional status of vitamin D in extreme obesity and its correlation with MS, in Brazil.

Objective: Individuals [body mass index (BMI) ≥ 40.0 kg/m²] recruitment from pre-operative to bariatric surgery.

Material & Methods: A descriptive cross-sectional study was conducted with individuals of both sexes, aged 21–59 years (n = 60). Anthropometric data [waist circumference (WC), besides BMI] and metabolic parameters [blood pressure and blood glucose, HDL-cholesterol, triglycerides (TG) and vitamin D (25(OH)D)] were obtained. The cut-off points for vitamin D deficiency and insufficiency were ≤ 20 and 21–29 ng/mL (1), respectively. MS diagnosis was carried out according to NCEP/ATP III (2).

Results: Thirty individuals were selected from pre-operative to sleeve gastrectomy (G1) and thirty from pre-operative to Roux-en-Y gastric bypass (G2). In G1, 100% were female, mean age of 39.9 ± 12.1 and mean BMI of 41.7 ± 2.8 . In G2, 60% were female, mean age of 45.7 ± 9.7 and mean BMI of 41.4 ± 3.1 . 25(OH)D nutritional status showed 40% insufficiency and 40% deficiency in G1 (mean of 23.3 ± 8.3) versus 20% insufficiency and 53.3% deficiency in G2 (mean of 24.3 ± 9.6). 60% of the individuals in both groups presented MS. The lowest 25(OH)D values were found in MS individuals versus non-MS (18.2 ± 4.3 /p = 0.039 and 20.2 ± 3.6 /p = 0.021 in G1 and G2, respectively). Among MS components, WC and TG levels were negatively correlated with 25(OH)D values, $r = -0.645$ /p = 0.021 and $r = -0.583$ /p = 0.036, respectively, and WC and blood glucose concentrations, $r = -0.664$ /p = 0.038 and $r = -0.355$ /p = 0.041, respectively, in G1 and G2.

Conclusion: High prevalence of reduced 25(OH)D levels were found in Brazilian class III obese individuals, waiting for bariatric surgery, that associated with MS components.

References:

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PO2.203

Early Metabolic outcome after Laparoscopic Sleeve Gastrectomy in morbid obese patients

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Background: Morbid Obesity (BMI > 40 kg/m²) is a substantial health problem that is related to many metabolic disorders including diabetes, hypertension and hypercholesterolemia and several cardiovascular diseases. This study we aimed to investigate the early metabolic changes which occur after Laparoscopic Sleeve Gastrectomy

Methods: One hundred morbid obese patients (65 females and 35 males) aged between 18 to 50 years with BMI range between 40–50 kg/m² were enrolled in this study. Patients were followed up after 3 and 6 months post operation to monitor their BMI, serum glucose level, insulin, serum cholesterol level, triglycerides and systolic blood pressure.

Results: A significant correlation was found between the percent decrease in BMI and the percent decrease in the measured metabolic parameters especially cholesterol and triglycerides levels at three and six months post-operatively

Conclusion: From the above results we can conclude that LSG is not only an effective bariatric procedure for loss of weight but also it plays an important and effective role in correction of metabolic disturbance associated to obesity especially diabetes type 2 very early after the operation

PO2.204

Improvement in BMI, HbA1c and associations with prescribed hypoglycaemic therapy in an East London medical obesity service

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Background: Obesity is a major public health concern in the UK where 24.7% of adults are overweight. The Barts Health Obesity service is one of the longest running services in the country and has a unique cohort of socioeconomically deprived and ethnically diverse severe complex obesity patients poorly described elsewhere in the literature. We present retrospective data to examine whether the service is effective in helping patients to loose weight, prescribing patterns in patients of different severities of obesity and whether there is an association between use of any of the hypoglycaemic agents and weight loss.

Methods: Patient records from 335 patients attending the Barts Obesity Clinic over a 21 month period were analysed. Serial BMI measurements prescribing records and blood results as well as demographic information was obtained from electronic patient records or manually retrieved from clinic letters. Data was examined for normality and treated non-parametrically where appropriate using SPSS.

Results: Time spent under the care of the clinic correlated significantly but weekly with a reduction in BMI (Spearman's rho 0.265, p = 0.20) however this effect is not significant when follow up is restricted to one year. We observed a significant correlation between time spent in clinic and an improvement in HbA1c (Spearman's Rho 0.243, p = 0.036). There was no difference in the prescribing prevalence of 5 common hypoglycaemic agents (Metformin, Gliclazide, SGLUT2 inhibitors, GLP1 analogues and Insulin) between patients of different severities of obesity. Liraglutide was significantly associated with weight loss (p = 0.035, median weight loss of 1.7 Kg/m²) but we were unable to look at specific combinations of drugs.

Conclusions: We have shown a small but significant weight loss as a result of being under the care of the Barts specialist obesity service however this effect disappears when follow up is restricted to one year. Loosing weight in this setting requires patients to be well motivated and therefore engage for a prolonged period of time. We also showed an improvement in HbA1c and a significant association between being on liraglutide and loosing weight which appears to support the conclusions of recent RCTs.

PO2.205

Is safe fructose for diabetic patients?

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Intake of some nutrients such as fructose is thought to cause the development of diabetes. In the past, fructose intake was provided by natural sources such as fruits and honey, and daily intake was 16–20 g. However, daily fructose intake has increased up to 85–100 g in the last 30 years due to the addition of sugar (sucrose, high fructose corn syrup, honey, molasses and other syrups) to carbonated beverages, fruit juices, bakery products etc. [1]. Recent studies indicate that the increase in fructose intake is in parallel with the increase in obesity and diabetes [2,3]. Although the effects of fructose on diabetics are not very clear, diabetic patients have the impression that it can be a therapeutic tool in their diet due to the fact that its glycemic index is low and it does not require insulin in its metabolism. In addition, it has also been reported that fructose has a positive effect in that it increases energy expenditure in obese individuals with or without diabetes. However, it has also been reported that fructose has a detrimental effect on insulin resistance when it replaces starch in a 5-week long diet in which 15% of the daily energy is received from fructose. Insulin secretion of the pancreatic cells affected by fructose-induced lipotoxicity may decrease [4]. Fructose intake in small amounts does not cause adverse health effects in people with diabetes. However, due to possible negative effects of added fructose, foods that contain high fructose corn syrup should be consumed within the limits specified. In case fructose is used as a sweetener, the amount used should be taken into account. In addition, WHO recommends that added sugars should intake max 10% of energy intake, with a proposal to lower this level to <5% for optimal health.

References

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- 3 Glob Public Health 2013;8(1):55–64.
- 4 Endocr Rev 2008;29(3):351–366

PO2.206

Ten-years weight change in the Swedish Obese Subjects (SOS) study control group

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Background: The Swedish Obese Subjects (SOS) study has shown long-term effectiveness of bariatric surgery in terms of weight-loss and reduced risk of mortality and morbidity compared to the control group. However, detailed analysis on weight changes in the matched obese control group has not been performed.

Objectives: The aim of this analysis was to analyze weight changes over 10-years in the control group of the SOS-study.

Material/Methods: From the SOS control group, 2025 patients (582 men and 1443 women) were identified (48.7 ± 6.3 years, BMI 40.1 ± 4.7 kg/m²). The primary care treatment of this group was not pre-specified by the SOS-protocol. Self-reported data on weight-loss methods used were analyzed in relation to 10-years weight change. Data was analyzed at baseline and after 0.5, 1, 2, 3, 4, 6, 8 and 10 years. Patients were divided into 5% and 10% weight-change categories.

Results: At each follow-up time point, approximately 80% of the patients reported that they had tried some method to lose weight. The average weight change from baseline to 10 years was 2.1 ± 13.0 kg. From baseline to 10 years, 14.1% and 22.3% of the patients had 5.0–9.9% and ≥10% weight-loss, respectively. During the same time period, 13.5% and 12.4% of the patients had 5.0–9.9% and ≥10% weight-gain, respectively. Five of

the original 2025 patients lost ≥10% in weight during the first year and maintained this weight-loss during the next nine years. The most commonly self-reported weight-loss methods for these five patients were health-care support, dieting in own regime and regular weekly exercise.

Conclusion: In the SOS control group, the majority of the patients reported that they tried to lose weight but only a small fraction obtained long-term clinically significant weight loss. Even fewer patients rapidly lost 10% of their weight and maintained this weight loss over longer time periods. This highlights the difficulties of long-term weight loss maintenance in severely obese patients.

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PO2.207

The never ending journey? Five years with a gastric band: An undertaking in the style of Joseph Campbell's hero's journey

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Background & Aims: In the United Kingdom, gastric banding (GB) surgery may be considered for tackling obesity in individuals who fulfil the National Institute for Health and Clinical Excellence criteria (NICE, 2014). Despite the many benefits of GB, our aim was to address the paucity of information on the long-term psychological impact of GB. During analysis, the language the participants used to describe the process (adventure, journey) were evocative of Campbell's (1949) hero's journey.

Objectives: To undertake a super-ordinate analysis utilizing Campbell's 12 stage hero's journey as a coding structure.

Methods: In this prospective qualitative study, semi-structured interviews were undertaken pre-banding, 6 months post, then annually up to 5 years post-banding with seven individuals (age range 39–58 years; 5 female).

Results: The hero's journey was an excellent fit for describing the study participants' experiences. They began in the "Ordinary World" where they felt stigmatised and unwelcome. The absence of a "Mentor" to motivate, challenge, aid with problem-solving, and to whom participants could be accountable was a significant problem. Mistakenly, pre-operative preparation focussed too much on surgery ("Crossing the Threshold"), leaving participants unprepared to deal with the "Tests" associated with living with the band, or the "Ordeal" - dealing with some significant life event. At five years post-banding, participants had yet to gain their "Reward" (the secret to being able to manage their eating and weight).

Conclusion: At five years post-banding the journey remains to be completed; none of the participants had reached their ideal body size and all were still dependent on the band to control their eating. More work was needed, and lack of support was a key issue.

Reference:

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NICE. (2014). Obesity: Identification, assessment and management of overweight and obesity in children, young people and adults. Retrieved from <http://www.nice.org.uk/guidance/CG4189>

Acknowledgements: The wider team involved in the data collection for this research were; Hilary Holloway, Marianne Morris, Karen Lilly, and Bev Corbett.

PO2.208

Robotic sleeve gastrectomy for morbid obesity: Report of a 5 year experience

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Background: Robotic bariatric procedures are nowadays in the surgeon's arsenal for the treatment of morbid obesity. With proven efficacy and advantages in gastric bypass procedures, we attempted to employ robotics and study the results in the other major bariatric procedure, sleeve gastrectomy.

Methods: We used the da Vinci S® system to perform 19 robotic sleeve gastrectomies (RSGs) and reviewed the 5-year results as far as excess body weight loss is concerned, and amelioration of obesity-related comorbidities.

Results: Mean percentage of excess body weight loss (%EWL) was 64.4%, 67.1%, 61.7%, 63.1%, 64.8% for the first, second, third, fourth and fifth year, respectively. Neither of our two patients with diabetes mellitus (0%) or hypertension (0%) showed remission, while all six of our patients (100%) showed remission of their sleep apnea after 5 years.

Conclusions: Robotic sleeve gastrectomy is an effective procedure as far as initial excess weight loss is concerned and this loss is well maintained 5 years post-operatively, a finding similar to relevant data after conventional laparoscopic sleeve gastrectomy.

PO2.209

Evaluation of attendance and weight loss in an adult weight management clinic

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Background: The high prevalence of obesity in Iran is of growing concern, and yet little is known about factors related to successful weight loss. This study aimed to evaluate the weight loss in terms of percent of weight loss success, and rate of attendance in nutrition clinic.

Method: In this cross-sectional study, we conducted an analysis of data from 1100 patients with overweight and obesity aged 16 to 65 years, who was referred to the nutrition clinic and met the conditions to participate in this study. Odds ratios (ORs) and 95% confidence intervals (CIs) for achieving 5% or greater weight loss by 6 months were calculated. For data analysis, SPSS software version 22 was used.

Results: Nonattendance rate upon referral was 58%. Of the group attending, 54% (281) successfully lost 5% or greater weight during 6 months. The successful and unsuccessful groups did not differ significantly on any of the baseline characteristics ($P < 0.05$). At month 1, women who averaged $\geq 2\text{kg/month}$ loss were twice as likely to achieve 5% weight loss or greater by 6 months than those who did not ($\text{OR} = 2.7$; 95% CI: 2.05–3.57); Regression model indicated that the Frequency of attendance ($\text{OR} = 2.1$) and weight loss at months 1–2 were similarly predictive ($\text{ORs} = 2.7\text{--}2$).

Conclusions: Successful weight loss was seen in 54% of individuals during 6 months and weight loss progress at month 1 and 2 of treatment predicts weight loss outcomes.

PO2.210

The 50 split: Impact of baseline BMI on weight loss outcomes 5-years after gastric banding

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Background & Aims: Gastric banding (GB) is widely used to enable individuals to lose weight. Weight loss outcomes for individuals with a Body Mass Index (BMI) ≥ 50 prior to banding continue to be debated. There is both support (Parikh, et al., 2005), and opposition (Chevallier, et al., 2007) about the usefulness of surgery in super-obese individuals.

Objectives: To explore long-term weight loss outcomes in individuals with a pre-banding of BMI \leq and ≥ 50 .

Methods: This prospective study weighed 86 individuals pre-banding, 6 months post, then annually for 5 years following GB (age range, 25 - 73 years, mean \pm SD, 45.15 ± 9.94 ; 68 female). The sample were split into the following BMI groups prior to analysis; BMI ≤ 49 ($n = 37$) or ≥ 50 ($n = 49$). Intention to treat analysis using the last observation carried forward was used.

Results: Individuals with a BMI ≤ 49 reached maximum weight loss at 2-years post-GB (20.1kg). Those with a BMI ≥ 50 achieved their maximum weight loss at 3-years post-GB (31.6kg). Effect size calculations of the differences between the BMI groups indicated differences were very large at baseline ($d = 1.4$), but reduced to medium size by 5-years post-GB ($d = .6$). Repeated measures MANOVA analysis revealed a main effect of weight over the 5-years post-GB ($F(6, 79) = 39.9$, $p < .001$), with a significant two-way interaction between weight lost and BMI group ($F(6, 79) = 2.4$, $p = .04$).

Conclusion: Long-term, individuals who have a BMI ≥ 50 prior to GB have greater weight loss than individuals with a BMI ≤ 49 , as they have more weight to lose this finding is encouraging. GB may be an effective surgical intervention for individuals with a BMI ≥ 50 .

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Chevallier et al (2007). Predictive factors of outcome after gastric banding: a nationwide survey on the role of center activity and patients' behavior. *Annals of Surgery*, 246(6), 1034–1039.

Parikh et al (2005). Laparoscopic bariatric surgery in super-obese patients (BMI > 50) is safe and effective: a review of 332 patients. *Obesity Surgery*, 15(6), 858–863.

Acknowledgements: Hilary Holloway coordinated the data collection for this research.

PO2.211

Obesity care management for adolescents through multidisciplinary meeting: Insight PRALIMAP-INES trial

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Background: A screening process with a closely followed intervention for reducing obesity is a key strategy in the primary prevention chronic diseases at adulthood, particularly for underprivileged populations. The objective was to implement a strategy aiming to coordinate health actors of different levels and to offer an adapted program to adolescents from a low socioeconomic background suffering from obesity.

Methods: A care management for adolescents, included in PRALIMAP-INES trial, was developed upon multidisciplinary meetings. It proposed different activities, to overcome the known determinants of inequalities, inside schools (Motivational interviews, Food workshops...) and outside schools (medical check-up near the Obesity Centre...).

Results: 306 adolescents suffering from obesity were included in the PRALIMAP-INES trial whose 101 assigned to the experimental low socioeconomic group with activities adapted to their needs. 90% of the assigned adolescents participated in at least one adapted activity. They significantly more frequently reported having changed their eating and physical activity behaviour than the advantaged adolescents and the less advantaged who didn't receive the adapted activities. (67.9%, 58.2%, 56.7% respectively. $p < 0.025$). Discussion The multidisciplinary meetings implementation outside hospital, to elaborate a care management adapted to adolescents is innovative. The coordination between the actors allowed the adolescents

to access care for a medical check-up nevertheless the follow up care remains complicated.

Conclusion: The interests of a screening and of an adapted care management proposal within schools for adolescents suffering from obesity are suggested by the study results. Comorbidities and/or at risk situations were revealed during the activities implementation. PRALIMAP-INES program is funded by INCA – Call of proposals 2011: Interventional research aiming to reduce inequalities in relation to cancer

PO2.212

A Randomised Controlled Trial of Manualized Cognitive Remediation Therapy in Adult Obesity

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Objective: Research has indicated that obese individuals have neurocognitive inefficiencies, especially in executive function that may in turn impact on their weight loss and maintenance. Consequently, we examined the efficacy of a manualized cognitive remediation therapy for obesity (CRT-O) within a randomised controlled trial, in terms of improving executive function, reducing binge eating behaviour and helping with weight loss.

Methods: 80 obese adults (body mass index >30 kg/m²), 75% binge eaters, received three weekly sessions of group Behavioural Weight Loss (BWL) and then were randomised to 8 sessions of individual CRT-O or to a no-treatment control group.

Results: Mixed-effects model analyses revealed that the CRT-O group had a significant improvement in executive function at post-treatment and 3-month follow-up compared to the control group (Cohen's *d* = 0.96 to 2.1). 68% of those in the CRT-O group achieved a weight loss of 5% or more at follow-up compared to only 15% of the controls (Cohen's *d* = 1.4). Changes in executive function predicted changes in weight (*p* < .05). Binge eating reduced in the CRT-O group compared to the control (Cohen's *d* = 0.80).

Discussion: This study suggests that CRT-O enhances weight loss. Future CRT-O studies with longer follow-ups and pairing it with longer BWL programs are needed.

PO2.213

Impact of bariatric surgery and intensive lifestyle intervention on serum omega-3 profiles

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Background and Aims: Bariatric surgery and intensive lifestyle intervention represent different approaches to induce weight loss and improve metabolic disorders in patients with severe obesity. We examined the short term effects of laparoscopic sleeve gastrectomy (LSG) and biliopancreatic diversion with a duodenal switch (BPDDS) on serum fatty acid (FA) levels (1) with the aim to reveal impact on essential FAs and the ratio of eicosapentaenoic acid (EPA) to arachidonic acid (AA) which impacts, e.g., cardiovascular health and obesity-induced inflammation. Similarly, we investigated the effect of intensive lifestyle intervention on FA levels (2).

Material and Methods: Serum samples after overnight fasting were collected at baseline and during treatment for bariatric and lifestyle patients. FA profiles were quantified by gas chromatography and compared by univariate and multivariate analysis.

Results: For BPDDS, the ratio EPA/AA was lower than recommended values (*p* < 0.05) one year after surgery. For LSG, the ratio was lower (*p* < 0.05) 3 months after surgery, but not after 12 months. In lifestyle patients, the ratio was unchanged after treatment as was the levels for all omega-3 FAs. After 6 weeks, the weight loss in lifestyle patients was two thirds of the weight loss in LSG patients.

Conclusion: Bariatric surgery lowers the serum omega-3 fatty acids significantly and below recommended values for EPA, but LSG patients resurge towards normal values after approximately 12 months. Intensive lifestyle intervention greatly reduces elevated total fatty acids serum level and levels of most fatty acids, but not omega-3 fatty acids. Slower weight loss accompanying lifestyle intervention compared to bariatric surgery may partly explain why omega-3 levels are retained during lifestyle intervention: Less energy shortage in lifestyle patients than bariatric patients implies less input of serum fatty acids from the patients' own fat deposits which contain low amounts of omega-3.

References:

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PO2.214

Multidisciplinary management of obesity

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Obesity is a pandemic that must be properly confronted. Currently we see that still a multidisciplinary management of obesity worldwide performed. Therefore, it seems critical to expose what are the reasons that this type of management is required and thus make a change in medical practice from the disease. During this work specific tools that help the correct diagnosis and management of obesity and the change that is required to better maintenance of weight loss will be awarded. We also want to stress that weight loss is not the only goal of treatment of obesity. Clinical cases in which decisions are multidisciplinary basic for patients reaching the goal of weight loss, and most importantly the maintenance of weight lost is also attached.

Table 1. Multidisciplinary management table comparing against one consultation with nutrition

In this table we see that there are changes regarding the duration of treatment parameters, abandonment, exercise and fat percentage in patients managed only by nutrition versus patients with multidisciplinary management.. This table was taken from the study by Donini LM Savina C, Castellana E, Coletti C, Paolini M. Multidisciplinary approach to obesity. *Eat weight disord*, 2009 mar; 14(1): 23–32

	Nutrition Group	Multidisciplinary Group
Duration of treatment	48.6 +/- 55 days (p0.000)	142 +/- 26 days
Abandonment	54% (p0.000)	5.5%
Distance covered in the 6-minute test	40.5 +/-17 m (p0.004)	59.9 +/- 19
Fat percentage	10 - 12%	22 - 45%

PO2.215

Displacement of the intragastric balloon from the fundus to the antrum results in increased weight loss

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Background & Aims: The Bioenterics Intragastric Balloon (BIB) consists a reliable, non-invasive technique to manage obesity for subjects who refuse or are unsuitable for bariatric surgery. In a prior study, BIB placed in the antrum was found to have significantly better results on weight loss in relation to that in fundus; but many balloons which were initially placed in the fundus were eventually found in the antrum.

Objectives: We scheduled to compare retrospectively the weight loss parameters after balloon placement in the fundus [F], in the antrum [A] and in the fundus which displaced to the antrum [FA].

Material/Methods: 668 patients that had undergone successful BIB placement and removal were assigned into three groups, as mentioned above: group F, n = 354; group A, n = 159, group AF, n = 155. Weight loss parameters were recorded at 3 and 6 months.

Results: Initially, BMI was statistically assessed. In all 3 groups there was a significant, progressive reduction of BMI at 0, 3, and 6mo: In Group F BMI was 44.34 ± 8.4 , 40.22 ± 10.2 , and $37.45 \pm 7.8 \text{ kg/m}^2$, respectively; in group A it was 44.22 ± 7.6 , 39.56 ± 7.9 , and 36.34 ± 6.8 , respectively; and in group FA it was 43.56 ± 8.9 , 36.55 ± 6.7 , and $34.28 \pm 7.9 \text{ kg/m}^2$, respectively. The statistically significant difference [$p = 0.001$] between groups, in the same time-period is prominent; the FA group resulted in the greater weight loss.

Conclusion: Although it sounds unconventional, the greatest weight loss was achieved in those patients where the balloon was displaced, for still unclear reasons, from the fundus to antrum through the time-course of 6mo treatment.

Reference:

Papavramidis TS, et al. Intragastric balloon fundal or antral position affects weight loss and tolerability. *Obes Surg*. 2012;22:904–9.

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PO2.216

Nutrients intake assessed with Diet History Questionnaire II in relations to the long-term calcium-phosphate control in hemodialysis patients with end-stage renal failure

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Introduction: Diet is a key factor that determines proper alignment of calcium-phosphate and nutritional status among haemodialysis (HD) patients. The aim of the study was to assess the nutrients intake in relations to the long-term calcium-phosphate control in haemodialysis (HD) patients with end-stage renal failure.

Material/Methods: The study included 107 patients (66 men) from 10 dialysis centres in Silesia region. To analyse diet composition during a prior year, with portion size version of Diet History Questionnaire II from National Institutes of Health was used. Poor long-term alignment of calcium-phosphate homeostasis was defined as presence of over 50% monthly phosphorus concentrations that exceeded 5 mg/dL and for calcium 10.2 mg/dL.

Results: Lower than recommended protein intake was found in 63% of HD patients (average consumption of $0.9 \pm 0.5 \text{ g/kg/d}$). Most of the patients consumed too much fat ($33.5 \pm 6.7\%$ of energy) and sodium ($2912 \pm 1542 \text{ mg/d}$). In 42% of patients dietary phosphorus intake was consistent with the recommendations ($13.3 \pm 7.5 \text{ mg/kg/day}$). Protein intake over 1.2 g/kg/d resulted in an increased consumption of phosphorus, but did not increase the risk of misalignment of phosphorus concentrations – OR = 1.15 (0.40–3.27); $p = 0.8$. Poor serum phosphorus concentrations control was observed in 69% of patients (they were in average 8 years younger). The average intake of protein and phosphate in the group with good and bad serum phosphorus alignment did not differ significantly.

Conclusion: The adequate control of protein intake is not sufficient to obtain phosphorus alignment especially in younger HD patients.

PO2.217

Gastric Perforation following Intra-gastric Balloon Insertion: Combined Endoscopic and Laparoscopic Approach for Management: Case Series and Review of Literature

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Introduction: Obesity is a serious disease, with substantial morbidity and mortality. The endoscopic placement of an intragastric balloon (IGB) in association with a low-calorie diet is an option for the treatment of obesity. IGB complications include dislocation of the balloon causing intestinal obstruction, upper gastro-intestinal bleeding and perforation, especially during balloon insertion or removal.

Methods: We report three cases of gastric perforation following IGB insertion that were successfully treated by a minimally invasive combined endoscopic and laparoscopic approach.

Results: All patients were treated successfully by a minimally invasive approach with less morbidity than the conventional open laparotomy.

Conclusion: Gastric perforation should be suspected in any patient with IGB who presents with acute abdomen. This can be managed with a minimally invasive approach.

PO2.218

Obesity 28 day gentle trial with meditation and clinical self-hypnosis

Boland, R.

Dept of management, international luniversity in Geneva

Gentle approach to obesity control with 28 day trial using meditation and clinical self hypnosis. Full details on www.crelearning.com Ten year experience with over 1000 cases. Worldwide. Group based therapy with both individual and interactive support Freely available without charge.

PO2.219

Weight loss intervention trial comparing intermittent low carbohydrate versus continuous Mediterranean diet

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Background: Adult weight gain in pre and postmenopausal women increases the incidence of postmenopausal breast cancer (BC) and weight loss can reduce this risk (1). Harvie et al (2013) investigated the effects of an intermittent low carbohydrate restriction (ILCD) in women with a family history of BC and showed that this resulted in superior fat loss compared with daily restricted Mediterranean diet (DRMD) (1).

Aims and Objectives To compare fat loss in overweight women with no family history of BC randomised to either an ILCD or DRMD. Materials and methods Overweight women (BMI 25–32), aged 18–65 years were randomised to either an ILCD (n = 43) or DRMD (n42 (Fig 1)). Body composition (Tanita body composition analyser SC- 330ST) waist, hip circumference, weight, and blood pressure (Ormon M6) were measured at baseline, week 4, 8, and 12. Moderate exercise was encouraged (aim 90mins/week).

Results: Attrition was 11%, body fat % reduced in the DRMD (median -2.9kg (95% CI: -2.6, -2.1) and the ILCD (median -2.9kg (95% CI: -2.3, -2.0), this was not significantly different (p = 0.063). Reductions in weight loss in the DRMD (median -2.8kg (95% CI: -3.0, -2.6) and ILCD (median -2.5kg (95% CI: -2.5, -2.5) between groups also showed no statistical difference (p = 0.068) (table 1), 36% achieved 5% Weight loss in both groups. **Conclusion:** There was no significant benefit of ILCD versus DRMD in overweight women, both diets resulted in fat and weight loss.

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Fig 1. CONSORT Screening, recruitment and withdrawal information, ILCD, intermittent low carbohydrate diet, DRMD, daily restricted Mediterranean diet

Table 1. Body composition, fat mass and fat free mass over twelve weeks

Parameters*	Baseline		Week twelve		P Values
	Mean	95% CI	Mean	95% CI	
FM (KG)**					
ILCD	31.8	30.4, 33.4	28.9	28.1, 31.4	0.063**
DRMD	29.1	28.0, 31.9	26.2	25.4, 29.8	
FFM (KG)**					
ILCD	46.9	46.1, 47.8	45.7	44.6, 46.8	0.463**
DRMD	46.7	45.4, 47.5	45.0	43.8, 47.6	
Weight (KG)					
ILCD	79.5	77.4, 81.6	77.0	74.9, 79.1	0.068
DRMD	76.6	74.0, 79.2	73.8	71.9, 76.6	
Waist (CM)					
ILCD	95.0	93.0, 97.0	88.7	87.4, 91.3	0.043
DRMD	92.0	89.8, 94.2	86.3	84.0, 88.7	
Hip (CM)**					
ILCD	101.9	100.6, 112.0	105.8	104.0, 110.8	0.023**
DRMD	106.2	105.9, 109.6	101.9	101.3, 105.4	
Systolic BP (mmHg)					
ILCD	125.0	121.3, 128.9	117.7	113.3, 122.1	0.463
DRMD	124.9	120.8, 129.0	118.9	114.6, 123.2	
Diastolic BP (mmHg)**					
ILCD	80.0	78.0, 82.9	78.0	76.4, 82.0	0.673**
DRMD	80.0	78.2, 83.5	78.4	75.6, 81.2	

*ILCD (n=43), DRMD (n=42)

**Mann Whitney U for LOCF between the two groups at twelve weeks adjusted for baseline values

PO2.220

Improvements in fatty liver biomarkers in obese people after two months following a weight loss dietary intervention: RESMENA project

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Background and Aims: Nonalcoholic fatty liver disease (NAFLD) is the most common liver disturbance worldwide (20–30% prevalence in Western countries).

Objective: To evaluate the effect of a hypocaloric dietary strategy on markers of liver damage in obese people.

Material/Methods: 95 adults (49 ± 9 years) with excessive body mass (35 ± 4 kg/m²) and metabolic syndrome features underwent a hypocaloric dietary pattern for 8 weeks, within the RESMENA trial (1). Biochemical variables were measured using an autoanalyser Pentra C-200 (Horiba ABX) and CK18-fragments (M30 and M65) levels were assessed by ELISA assay. Android fat mass was determined using dual-energy X-ray absorptiometry (Lunar-iDXAe). A specific Fatty Liver Index (FLI) was calculated. All variables were taken before and after 2 months of treatment.

Results: Subjects significantly lost weight (6.9 ± 2.9 kg) and visceral fat mass ($3 \pm 3.2\%$). Markers of hepatic damage (M30, M65, transaminases, Gamma-Glutamyl Transferase, Triglycerides), FLI and android fat mass were significantly decreased after treatment. Participants with greater improvements in body composition also had higher benefits on liver damage. Thus, positive correlations between CK18-fragments and transaminases and FLI were found while negative correlations between CK18-fragments and weight loss and android fat mass reduction were obtained.

Conclusions: A precise nutrition strategy for weight loss may produce additional benefits in the management of NAFLD accompanying to obesity, which could be assessed by routine measurements, and novel markers such as CK18-fragments determinations.

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Acknowledgements: RESMENA study was supported by the Health Department of the Government of Navarra (48/2009) and the Línea Especial about Nutrition, Obesity and Health (UNAV LE/97). The support from CIBERobn and idiSNA are gratefully acknowledged. ICG holds a grant from the CIN Research of UNAV.

PO2.221

Gut hormone secretion, gastric emptying and glycemic responses to erythritol and xylitol in lean and obese subjects

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Background & Aims: With the increasing prevalence of obesity worldwide and a possible association with increasing sucrose consumption, non-nutritive sweeteners are gaining popularity. Artificial sweeteners might have adverse effects and alternative solutions are sought. Polyols such as xylitol and erythritol have been known for a long time and their beneficial effects on caries prevention and potential health benefits in diabetic patients have been demonstrated in several studies. Incretins (e.g. glucagon-like peptide 1 (GLP-1), cholecystokinin (CCK)) are released from the gut in response to food intake, promote satiation, reduce gastric emptying and modulate glucose homeostasis. The effect of xylitol and erythritol on incretin release has not been well studied.

Objective: To study incretin release in response to xylitol and erythritol intake and effects on gastric emptying.

Material/Methods: 10 healthy lean (BMI: 21.7) and 10 obese (BMI: 40.0) were given either 75g glucose, 50g xylitol or 75g erythritol in 300mL tap water or 300mL pure tap water (placebo). We measured plasma glucose, insulin, glucagon-like peptide 1 (GLP-1), cholecystokinin (CCK), and gastric emptying (GE) with a ¹³C-sodium acetate breath test.

Results: 1) Glucose, xylitol and erythritol stimulated CCK and GLP-1 release. 2) glucose, xylitol and erythritol induced a significant retardation in gastric emptying. 3) xylitol had only a small effect on insulin release and plasma glucose concentrations, whereas erythritol had no effect on

insulin release and plasma glucose concentrations. 4) Comparing lean to obese subjects, basal glucose and insulin concentrations were higher in the obese and the integrated insulin and response and plasma glucose concentration was also higher after the glucose treatment ($p = 0.007$ resp. $p = 0.03$). The integrated GLP-1 response to glucose administration was significantly higher in lean subjects ($p = 0.03$). There were no differences in CCK responses between the two groups.

Conclusion: Xylitol and erythritol lead to a marked increase in CCK and GLP-1, while insulin and plasma glucose are not or only slightly affected. Gastric emptying is slowed down by xylitol and erythritol.

PO2.222

Comparison of a very low-calorie-ketogenic diet with a standard low-calorie diet in the treatment of obesity: Values at 24 months of treatment

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Background: The prevalence of obesity is increasing rapidly worldwide and it is a major driving force for the increased development of several diseases such as cardiovascular disease, type 2 diabetes, and even cancer. Because the lack of effective drug treatments to facing this universal epidemic, to identify diets able to produce a significant and maintained weight loss is mandatory.

Objectives: The present work evaluated the efficacy of a very low-calorie-ketogenic (VLCK; Pronokal method) diet in obesity.

Methods: A group of obese patients were enrolled in a nutritional therapy during 24 months and were randomly allocated to two dietary strategies: the VLCK diet group and a standard low-calorie diet (LC group). Both groups received external support, counseling, to perform physical activity and adhered to the diet. Body composition was measured with anthropometry and dual-energy X-ray absorptiometry (DEXA). Visceral fat mass was estimated with specific software. All measurements were made at baseline, and after 2, 12 and 24 months.

Results: The VLCK diet induced a 30–45 days of mild ketosis and significant effects on body weight within 15 days. At 24 months of follow up, the weight reductions respect to baseline in the VLCK diet and LC diet groups were 12.4 ± 7.5 and 5.2 ± 6.5 kg, respectively ($p = 0.001$), and more than 54% of patients in the VLCK diet group lost more of 10% of their initial weight compared with only 13% in the LC diet group. This VLCK diet-induced weight reduction was accompanied by a higher decrease in visceral fat mass than the LC diet group (666.4 ± 490.9 g vs. 200.2 ± 330.3 g; $p = 0.001$) while lean mass was practically unaffected.

Conclusion: The VLCK diet was more effective than a standard LC diet. Relevantly, this beneficial effect was reflected in an important reduction of visceral fat mass, the main adipose tissue depot correlated with the metabolic diseases associated to obesity

PO2.223

Evaluating the Validity of the “Categories Method”: A New Method for Self-report Assessment of Daily Calorie Intake: A pilot study

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Introduction: Weight loss is mainly the result of reduction in daily caloric intake. Hence many people are interested in counting and tracking their daily caloric intake however, studies show that in fact only ~10% can accurately estimate the number of calories they eat. We suggest a new self-assessment method for calorie intake called the “categories method”: a single categorical estimation per meal set of five categories. The aim of this study was to evaluate the validity of this new method in comparison with the 24 hours diary recall.

Methods: This was a cross-sectional study of 29 participants (2 men) aged 44.2 ± 11.4 years. All were interviewed face to face on 1 occasion to obtain self-category estimation and 24 hours diary recall using the USDA “4 pass” interview method. The Categories method included: Category “1” less than 200 kcal, Category “2” 200–500 kcal, Category “3” 501–800 kcal, Category “4” 801–1200 kcal and Category “5” above 1200 kcal. Displaying the average value of each category (e.g., category 3: 500–800 Avg = 650 kcal), patients and professionals can sum up meals and estimate the total daily calorie intake. Calorie content were obtained from the Israeli’s Ministry of Health software. T- test and Pearson correlation test were used for statistical analysis. The study received ethical approval from the Assuta Hospital Systems ethics committee.

Results: BMI was 25.9 ± 8.7 kg/m². Reliability rate in selecting the right categories was 81.5%. The total calculate calories intake and estimate by the “categories method” were not significantly different (1671 ± 600 vs. 1584 ± 556 kcal/day) and the correlation was high (r=0.73, p < 0.05).

Conclusions: The “categories method” was shown to be reliable and accurate and might simplify the process of counting calories, especially with assembled or cooked meal. It makes it easier to track any given meal even to those who are not so familiar with the caloric value of a product. NIH clinicaltrials.gov #NCT01408784

PO2.224

Effect of a low caloric diet plus a probiotic on cytokines in obese prediabetic adults

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Introduction: Obesity is characterized by a low inflammation and a high risk of cancerogenesis. Cytokines play a crucial role in both inflammation and cancer development. In addition, cytokines are responsible for complication of diabetes type 2 and obesity. Thereafter, the aim of our study was to examine three pro-inflammatory cytokines in individuals with obesity and prediabetes.

Methods: Males and females were enrolled in a multicenter study for prevention of type 2 diabetes (NIRDIABO) in a Bulgarian cohort from three big cities. They received a low calorie diet (1200 kcal) with a probiotic (15 g, ELBI) every day for a 2-month dietary period. Before and after the intervention all subjects had medical examination with several anthropometric and biochemical measurements. OGTT was performed to evaluate the prediabetic status. HOMA index was measured based on a fasting blood glucose and insulin (ELISA method). Three pro-inflam-

matory cytokines (TNF alpha, IL1 beta, IL6) were measured in plasma by ELISA methods.

Results: Data demonstrated a significant decrease in plasma levels of TNF alpha, IL1 beta, and IL6 after a 2-month dietary intervention. The parameters of obesity and prediabetes also decreased significantly.

Conclusion: Our data suggest a possible inhibitory role of probiotics on inflammation in obesity and prediabetes. Further study is needed to elucidate this novel mechanism of probiotics that could be used in the prevention of type 2 diabetes. Funding: NIRDIABO project is supported by a Grant from the Ministry of education and science

PO2.225

Effect of a low calorie diet combined with a probiotic on carbohydrate metabolism in adults with obesity and prediabetes

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Introduction: Epidemiological study showed that 6% of the adult population in Bulgaria was with prediabetes. Obesity and prediabetes are risk factors for the development of type 2 diabetes in adults. Thus, the purpose of our study was to evaluate the effect of a low calorie diet plus a probiotic on parameters of carbohydrate metabolism in obese prediabetic subjects.

Methods: Males and females were screened for obesity and prediabetes and enrolled in a multicenter study for prevention of type 2 diabetes (NIRDIABO) in a Bulgarian cohort from three big cities. They received a low calorie diet (1200 kcal) with a probiotic (15 g, ELBI) every day for a 2-month dietary period. Before and after the intervention all subjects had medical examination with several anthropometric and biochemical measurements. OGTT was performed to evaluate the prediabetic status. HOMA index was measured based on a fasting blood glucose and insulin (ELISA method).

Results: At the beginning of the intervention the fasting blood glucose was between the range of 5.6–6.9 mmol/l. After 2-month dietary intervention the blood sugar decreases to the physiological rates (< 5.6). HOMA index decreased from 2.8 to 1.8, and the BMI decreased significantly. Glucose in urine was not present.

Conclusion: Low calorie diet in combination with probiotic exerts a strong beneficial effect on the carbohydrate metabolism. Furthermore, this combination decreases significantly the risk for development of type 2 diabetes in obese prediabetes adults. Funding: NIRDIABO project is supported by a Grant from the Ministry of education and science

PO2.226

Untargeted metabolomic approach a useful tool to assess the compliance with a nutritional intervention including cocoa extract

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Background & Aims: Metabolomics is an emerging tool to evaluate the bioavailability of food components and the compliance of dietary patterns as well as to assess metabolic changes derived from food intake (Odriozola et al., 2015).

Objectives: To evaluate the urinary metabolomic profile after the intake of ready-to-eat meals containing a cocoa extract.

Material/Methods: Fifty middle-aged volunteers [30.6 (2.3) kg/m²] participated in a 4 week, double-blind, randomized, parallel study. Half of them received ready-to-eat meals supplemented with 1.4 g of cocoa extract (415 mg flavanols) while the remaining subjects received the same meals without cocoa extract supplementation. Ready-to-eat meals were included within a 15% energy restricted diet followed by all the participants. Urine samples (24 h) were collected at baseline and after 4 weeks of intervention and were analyzed by High Performance Liquid Chromatography-Time Of Flight-Mass Spectrometry (HPLC-TOF-MS) in negative and positive ionization modes followed by multivariate analysis.

Results: Principal component analyses in the negative ionization mode was able to discriminate three groups; baseline group (subjects before the intervention), control group after the 4 week intervention and cocoa group after the 4 week intervention ($p < 0.01$). In the positive ionization mode baseline group and control group at 4th week were not clearly classified. The metabolite identification included metabolites related to theobromine metabolism (3-methylxanthine and 3-methyluric acid), food processing (L-beta-aspartyl-L-phenylalanine), flavonoids (2,5,7,3',4'-pentahydroxyflavanone 5-O-glucoside and 7,4'-dimethoxy-6-c-methylflavanone), catecholamine metabolism (3-methoxy-4-hydroxyphenylglycol-sulphate) and endogenous products (uridin monophosphate). All these metabolites showed a significantly higher excretion levels ($p < 0.001$) in the cocoa group.

Conclusion: Metabolomic analyses supported the compliance and follow-up of the volunteers with the intervention and indirectly suggested the bioavailability of cocoa compounds within the ready-to-eat meals.

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PO2.227

Comparison between different intramuscular vitamin B12 supplementation regimes: A retrospective matched cohort study

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Background: The incidence of vitamin B12 deficiency after bariatric surgery can range from 26–70%. There is no consensus on optimal vitamin B12 supplementation in postbariatric patients.

Aim: The objective of this study was to compare three different regimes of Vitamin B12 supplementation

Materials & Methods: In this retrospective matched cohort study, we included 63 patients with MMA levels ≥ 300 nmol/L. Twenty-one received 5 intramuscular (IM) vitamin B12 injections including a loading dose, twenty one patients received 3 IM vitamin B12 injections without loading dose and twenty one patients received no IM vitamin B12 injections.

Results: The total patient population consisted of 14 males (22.2%) and 49 women (77.8%) with a mean current body mass index of 30.6 ± 8.0 kg/m². There is no significant difference in vitamin B12 and MMA levels between 3 groups at baseline. There was a significant difference in follow-up vitamin B12 levels of the 5 IM injection regime compared to the 3 IM injection regime ($p = 0.02$), 5 IM injection regime compared to no regime ($p = 0.03$). In the follow-up results there is also a significant decrease in MMA levels of the 5 IM injection regime compared to 3 IM injections ($p = 0.02$), 5 IM injection regime compared to no regime ($p < 0.001$) and 3 IM injection regime compared to no regime ($p < 0.01$).

Conclusion: In this study, the 3 IM injection schedule without a loading dose is not sufficient to treat a vitamin B12 deficiency. A 5 IM injection

regime with loading dose recovered all vitamin B12 deficiencies biochemically.

PO2.228

The importance of the yoghurt fermented by *Bifidus essensis* as a dietary factor in the treatment of obesity

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Introduction: The role of yoghurt, respectively probiotics, in the treatment and prevention of obesity has been discussed. The aim of our study was to investigate the effect of yoghurt fermented by *Bifidus essensis* (0.5% fat) in the treatment of patients with obesity.

Materials/Methods: A total of 57 subjects with central type obesity (21 men and 36 women) were enrolled in the study. Baseline mean subject characteristics were: age-46.2 year old, body mass index (BMI)-35.4, fat mass- 39.4%, visceral fat-14.1, waist circumference-109 cm, hip circumference-120.2, and sagittal diameter-27 cm. All obese patients underwent a dietary regimen, included 290 g yoghurt fermented by *Bifidus essensis* for dinner for a 6-month period. The product consisted of proteins-4.3 g, carbohydrates (lactose)-3.9 g, fat-0.5 g, and 37 kilocalories per 100 g product. At the beginning and at the end of the study several anthropometric parameters have been measured by bioimpedance device (Tanita 420).

Results: The study demonstrated a decrease of BMI with 9.8%, of fat mass with 9.6%, of visceral fat with 14% as well as a decrease of waist circumference-11.9%, hip circumference-5.8%, and sagittal diameter-10.3%.

Conclusion: The regular consumption of yoghurt fermented by *Bifidus essensis* (0.5% fat) in the diet of obese patients leads to improvement of the studied anthropometric parameters as well as to significant decrease in the cardio-vascular risk.

PO2.229

Effect of low calorie diet plus probiotic on obesity parameters

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Introduction: Bulgaria is on one of the first places of obesity prevalence in the EU with more than 60% of the adult population with overweight and obesity. Thereafter, the aim of our study was to investigate the effect of low calorie diet with probiotic on individuals with obesity.

Methods: This study is part of a large multicenter project NIRDIABO. Adults (males and females) with an age between 20–70 years were screened for obesity and prediabetes. Subjects who covered the inclusion and none of the exclusion criteria were enrolled in the study. They received a low caloric diet (1200 kcal/ daily) with a probiotic (15 g/ daily, ELBI) for a period of 2 months. Before and after treatment all the subjects undergone anthropometric and body composition measurements (body weight, BMI, fat mass, fat free mass, visceral fat rating) as well as clinical lab parameters (blood, liver and kidney). The diet was a five-menu diet with the components of the Balkan diet (fruit and vegetables, legumes, meat, fish, low-fat yoghurt and dairy products, different types of seeds, sunflower oil etc.).

Results: The data showed a decrease in body weight, resp. BMI, fat mass and fat free mass in both genders after 2-months treatment with 1200 kcal plus probiotic daily.

Conclusion: Our data suggest that good nutrition components from the diet (the so called Balkan diet) together with probiotic have beneficial ef-

fect on individuals with obesity. Moreover, our data suggest that probiotic support general health, gastro-intestinal function, sleep etc.

PO2.230

Guideline for the Management of Insulin Resistance

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The successes of interventions to obtain weight loss and prevent relapse are limited. Moreover, comorbidities like type 2 diabetes mellitus, hypertension, hypercholesterolemia, hypertriglyceridemia and gout, have so far been treated as separate diseases, although mounting evidence shows that these morbidities are consequences of the failing metabolism due to insulin resistance. Weight loss, in other words treating obesity, improves comorbidities and improves quality of life. Treatment of obesity and its comorbidities is a multidisciplinary matter. It can be done in primary care. It should be widely recognized that a low carbohydrate diet and exercise are the two main aspects of treatment that lead to the desired RESULT: considerable weight loss and diminishment of comorbidities, visible through improvement of blood parameters and improved quality of life. Because of the complexity of the diet a large role in management is fit for dietitians, supported by psychologists, physiotherapists and exercise trainers. Family physicians and nurse practitioners need to be aware of the important role diet and lifestyle play. In insulin resistance medication is not the preferred treatment; it should be avoided as much as possible. By accepting this challenge in primary care, health professionals can change the prevalence and consequences of obesity and its comorbidities, thus reducing health care costs considerably. Persons that are insulin resistant may regain their health through these measures. They will always stay insulin resistant to a certain extent, and cannot eat normal quantities of carbohydrates that are commonly used and advised in general dietary guidelines.

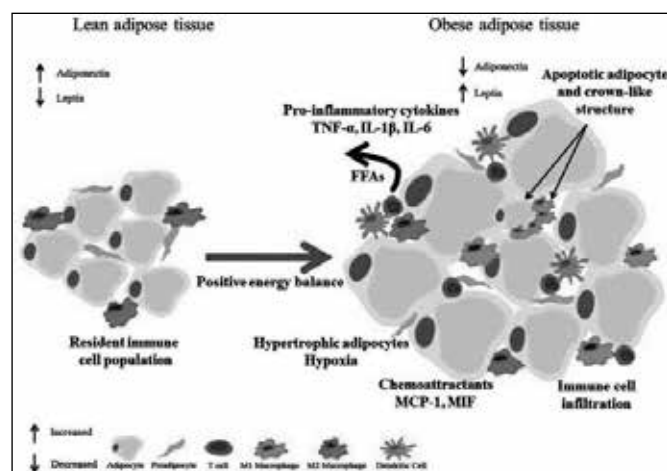


Fig. 1. Mechanisms of Obesity-Induced Inflammation and Insulin Resistance
A large energy intake (hyperphagia) combined with sedentary behavior leads to a positive energy balance, causing overfilling of the adipocytes, thus leading to the production of adipokines.

Table 1. Level of carbohydrate restriction related to BMI and waist circumference
The level of carbohydrate restriction depends on the severity of insulin resistance, which is often indicated by BMI and waist circumference.

<p>BMI > 35 kg/m². Waist circumference male > 102 cm, female > 88 cm.</p> <p>Fat mass > 50 kg, visceral fat > 20%</p> <p>Very strong carbohydrate restriction < 20 grams (VLCKD)</p> <p>The diet is fit for people with grade 3 obesity or grade 2 with comorbidities.</p>
<p>BMI > 35 kg/m². Waist circumference male > 94- 102 cm, female > 88 cm.</p> <p>Fat mass > 40- 50 kg, visceral fat 13- 20%</p> <p>Strong carbohydrate restriction 20–50 grams (low carb)</p> <p>The diet is fit for people with grade 3 obesity or grade 2 with comorbidities.</p>
<p>BMI > 30–35 kg/m². Waist circumference male > 94 -102 cm, female > 80–88 cm.</p> <p>Fat mass > 30–40 kg, visceral fat > 13%</p> <p>Moderate carbohydrate restriction 50–75 grams (low carb)</p> <p>For many patients a restriction of 50–75 grams is a large reduction of the daily carbohydrate intake.</p>
<p>BMI > 25–30 kg/m². Waist circumference male > 102 cm, female > 80–88 cm.</p> <p>Fat mass > 25–30 kg, visceral fat > 10–13%</p> <p>Mild restriction 75–125 grams or <26% energy%</p> <p>Leaving out carbohydrate rich snacks leads to a significantly lower carbohydrate intake.</p>
<p>BMI > 25–30 kg/m². Waist circumference male > 102 cm, female > 80- 88 cm.</p> <p>Fat mass > 20–25 kg, visceral fat 10–13%</p> <p>Light carbohydrate restriction 125–175 grams 26%–45 energy%</p> <p>A carbohydrate level for weight maintenance only.</p>

PO2.231

A Pilot Project to Assess the Success Rate of Dr. Poon's Metabolic Diet Program

Poon, P.

Dr. Poon's Metabolic Diet Clinic

A diet program was designed to treat obese patients with medical problems associated with their weight. This study was done to assess the success rate of the diet. A total of 384 overweight and obese patients were admitted to the diet program from January 2014 and their progress was followed for a period of 18 months. 62% of the admitted patients were able to lose 10% of their weight. The average amount of time to reach the 10% weight loss was 10 weeks. Among the patients who were able to lose 10% of their weight, 78% of them were able to lose additional weight, or maintained the 10% weight loss for up to 18 months, which was the length of the study. About 8% of the patients were able to achieve the normal BMI of 25. This result is very encouraging and the study is still ongoing, which will add more power to this study. The diet consisted of 3 phases, and was not a "how-much-to-eat" but a "what-to-eat" type of diet plan. It also did not require the patients to count calories, or measure the amount of food consumed. Patients were told to eat until full using a set of dietary guidelines, and the patients could eat the allowed food items at any time of the day. The main objective of the diet was to consume mostly proteins (for the essential amino acids), good fats (for the essential fatty acids), and high fiber vegetables, while limiting the consumption of sugar, starch, saturated fat, trans fat, and sodium. Phase One of the DPMDP had the least amount of sugar and starch allowed, while small amounts of sugar and starch were re-introduced when the patient progressed to Phase Two and Phase Three of the DPMDP. Other than the diet plan, the patients

also received instruction and counseling on exercise, label reading, human nutrition, supplements and stress eating. Patients were encouraged to join a patient-run self-help group on social media sites such as Facebook (Dr. Poon's Metabolic Diet Support Group), as well as in patient-run local support group meetings.

PO2.232

Evaluation of Relationship between Life Quality and Nutritional Status of Elderly

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Background: The progressive rise in life expectancy increases in the elderly population. It is important to increase healthy and quality years not only number of years in the elderly. Nutrition has positive effects on more healthy and quality years in elderly.

Objectives: This study was planned to evaluate life quality of elderly and its relationship with nutritional status of elderly.

Material/Methods: It was conducted at 182 healthy elderly (62 men and 120 women). Questionnaire form which is included dietary habits, demographic properties and life quality scale (SF-36), mini nutrition assessment form (MNA) and short nutritional assessment questionnaire (SNAQ) was performed with face to face by researcher.

Results: Mean age of individuals is 72.0 ± 6.29 years. Total mean score of physical and mental components of life quality score are 45.0 ± 16.61 ; 50.2 ± 15.69 respectively. It was found negative correlation between number of drug ($r: -0.212$; $p: 0.007$) and age ($r: -0.202$; $p: 0.006$) with life quality score. It was determined that there is no correlation between life quality score and daylight and night sleep duration and number of main meal and snack. Accordingly correlation between MNA and SNAQ with life quality score of elderly, it was found positive correlation between total mean score of physical and mental components of life quality score with MNA ($r: 0.371$, $p: 0.000$; $r: 0.235$, $p: 0.001$) and SNAQ ($r: 0.338$, $p: 0.000$; $r: 0.280$, $p: 0.000$).

Conclusion: There are positive effects of nutritional status on determination life quality of elderly. Adequate and balanced nutrition is important for high life quality in elderly.

PO2.233

What factors influence weight loss in participants of commercial weight loss programmes? Implications for health policy

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Background: Finding effective referral policies for weight management services would have important public health implications. Here we compare percentage weight change by referral methods, BMI categories and participants who have had multiple referrals to weight loss programmes.

Methods: A prospective cohort study of 15,621 participants referred to 12-week behavioural weight loss programmes paid for by public health services. Linear mixed modelling was used to assess percentage weight change after adjusting for covariates at 12 weeks follow-up.

Results: Participant's mean age was 48.5 years, 78.7% were of white ethnicity, 90.3% female and mean baseline BMI was 36.3 kg/m^2 . There were no significant differences in percentage weight loss between participants that self-referred and those that were referred by their GP. Likewise there were no significant differences between baseline BMI categories. Attending a weight loss programme more than once was associated with less weight loss at subsequent attendances (0.92%, 95% CI 0.70 to 1.14, $p < 0.001$).

Conclusion: Allowing self-referral to a weight loss programme widens access without compromising amount of weight lost. These programmes are

beneficial for those with a BMI $\geq 40 \text{ kg/m}^2$. Accessing weight management programmes for further attempts results in less weight loss and limiting access could be considered.

PO2.234

Effectiveness of a weight loss intervention among postpartum women: Results from the randomized controlled LEVA in Real Life trial

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Background: Reproduction has been identified as a trigger for long term weight gain among women; however, efficacy trials demonstrate that the postpartum period could be a window of opportunity for health care to intervene and curb this development.

Aim: To evaluate the short- and long term effectiveness of a diet behaviour modification treatment to produce weight loss among postpartum women within the primary health care setting in Sweden.

Method: During 2011–2014, 110 women with a self-reported body mass index (BMI) of $\geq 27 \text{ kg/m}^2$ at 6–15 wk postpartum were randomly assigned to diet behaviour modification group (D-group) or control group (C-group). Women randomized to D-group ($n = 54$) received a 12-wk diet behaviour modification treatment by a dietician and were instructed to gradually implement a diet plan based on the Nordic Nutrition Recommendations and to self-weigh ≥ 3 times per week. Women randomized to C-group ($n = 56$) were given a brochure on healthy eating. The primary outcome was change in body weight after 12 weeks and 1 year.

Results: At baseline, women had a median (1st; 3rd quartile) BMI of 31.0 (28.8 ; 33.6) kg/m^2 and the majority (85%) were breastfeeding. After 12 weeks, women randomized to D-group had a weight change of -6.1 (-8.4 ; -3.2) kg as compared to -1.6 (-3.5 ; -0.4) kg in C-group, $p < 0.001$. After 1 year, women in D-group maintained a significantly greater weight change as compared to women in C-group, -10.0 (-11.7 ; -5.9) kg vs -4.5 (-10.6 ; -0.8) kg, $p = 0.009$. The 12 week follow-up was completed by 100 (91%) and the 1-y follow-up is to date completed by 87 (79%) women and two more are expected to complete the study soon.

Conclusion: This trial demonstrates that diet treatment delivered by a dietician within the primary health care setting can produce clinically relevant and sustainable weight loss among postpartum women with overweight and obesity. Long term effectiveness of the treatment (2 years) will be further explored.

PO2.235

Effectiveness of the MetSLIM lifestyle intervention targeting low SES individuals of different ethnic origins with elevated waist-to-height ratio

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Background: Lifestyle interventions can have beneficial effects on risk factors for cardio-metabolic diseases, but are often less successful in people with low socioeconomic status (SES). We aimed to evaluate whether the lifestyle intervention MetSLIM, an adaptation of the SLIM intervention that was previously shown to be effective in reducing diabetes risk, was successful in improving waist circumference and other cardio-metabolic risk factors in low SES individuals of different ethnic origins.

Methods: MetSLIM was a quasi-experimental intervention study, carried out in deprived neighbourhoods, involving ethnicity-matched and gender-matched research assistants, dieticians and sports instructors. Subjects aged 30–70 y with an elevated waist-to-height ratio were recruited: 117 in the intervention group (12-month dietary and physical activity programme) and 103 in the control group. Drop-out was 31%. All subjects underwent anthropometric measurements and blood withdrawal, and completed questionnaires on dietary intake, physical activity and quality of life at baseline and after 12 months.

Results: Most participants were of Dutch (40%) or Turkish origin (48%). Mean age was 47.5 ± 9.2 y. Eighty-three percent of the participants were female and 38% had completed no education or primary school only. 27% had the metabolic syndrome. At 12 months, the intervention group showed significantly greater improvements than the control group in waist circumference ($\beta = -3.3$ cm, 95% CI -4.7 ; -1.8 , $p < 0.001$), weight ($\beta = -2.2$ kg, 95% CI -3.7 ; -0.8) and fat percentage ($\beta = -0.9\%$, 95% CI -1.8 ; -0.1). Additionally, greater reductions were observed for total cholesterol ($\beta = -0.33$ mmol/l, 95% CI -0.56 ; -0.10 , $p = 0.005$) and LDL cholesterol ($\beta = -0.35$ mmol/l, 95% CI -0.56 ; -0.14 , $p = 0.001$). No difference in HOMA-IR was found and prevalence of the metabolic syndrome did not change. Dietary changes were significant for fibre intake ($\beta = 1.5$ g/1000kcal, 95% CI 0.3 ; 2.7 , $p = 0.016$). The intervention group showed improvements in the quality of life domains 'health transition' and 'general health'. In general, the intervention effects were more beneficial among participants of Dutch origin than among participants of Turkish origin, especially for the different anthropometric measures.

Conclusions: This study showed that the MetSLIM lifestyle intervention is effective in improving body fat and its distribution, cholesterol and quality of life among individuals with low socioeconomic status of different ethnic origins.

PO2.236

What women perceive as reasons for their unhealthy weight gain during and after pregnancy: A qualitative interview study

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Background & Aims: New and improved ways of treating and preferably preventing obesity are needed. Three out of four female patients in an obesity clinic claim that their pregnancy contributed to their obesity by retaining around 10 kg from each pregnancy. Studies confirm the association between weight retention post partum and obesity later in life. We aimed to explore what factors women reported as relevant for their weight retention and thereby identify new focus areas for therapeutic interventions.

Objectives: To identify factors that women perceive as reasons for unhealthy weight gain and weight retention during and after pregnancy. **Material & Methods:** Thirteen women who retained ≥ 10 kg of their pregnancy associated weight one year post partum, were interviewed by a cognitive therapist. Qualitative content analysis was used to analyse the interview data together with two researchers experienced in qualitative methods. Text data where coded and then clustered to reveal underlying themes.

Results: All participants reported lacking knowledge about risks for adverse pregnancy outcomes related to excessive weight gain. Risks with excessive weight gain for pregnancy-related adverse outcomes were perceived as either not brought up at all or toned down by medical staff during pregnancy. There was an exaggerated reliance on breastfeeding for weight loss. Emotional eating emerged as a mediator for both physiological and psychological factors such as pain and depression on the pathway to weight retention. Weight loss support from medical care was sometimes absent and occasionally rejected by the mother because of shame.

Conclusion: There is a lack of risk awareness of pregnancy-related adverse outcomes associated with excessive weight gain, both among medical staff and pregnant women. Women who use eating as a strategy to cope with

uncomfortable emotions may be more vulnerable to weight retention after pregnancy. Improving risk communication around pregnancy and support for weight loss post partum may improve weight outcome.

PO2.237

The psychological impact of bariatric surgery

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Introduction: Bariatric surgery and its associated weight loss is a well-established treatment for the major co-morbidities associated with morbid obesity – diabetes, hypertension and sleep apnoea. Relatively little information exists regarding the psychological impact of weight-loss surgery.

Aim: To evaluate nine psychological indices preoperatively, at 6 months and at one year post-operatively in a series of morbidly obese patients undergoing bariatric surgery, utilizing validated questionnaires.

Methods: Between July 2012 and July 2014, 42 patients undergoing bariatric surgical intervention consented to a detailed psychological assessment immediately prior to surgery and at six months and one year following surgical intervention. Twenty eight (67%) were female. The median age was 48(24–74)yrs.

Results: The largest fall in Body Mass Index (BMI) was in the first 6 months following surgery (see table). QOL, BD, HAD, PC and SE indices were all clinically and statistically (t-test) significantly improved at 6 months post-operatively. There was no significant difference in coping measures, physical complaints, eating attitudes or profile of moods following surgery. These improvements were maintained, but did not improve further, despite further weight loss at one year.

Conclusions: Bariatric surgery has a dramatic effect on certain psychological indices – particularly symptoms of anxiety and depression. These effects are still evident at a year following surgery.

Table 1. THE Results

The largest fall in Body Mass Index (BMI) was in the first 6 months following surgery. QOL, BD, HAD, PC and SE indices were all clinically and statistically (t-test) significantly improved at 6 months post-operatively. There was no significant difference in coping measures, physical complaints, eating attitudes or profile of moods following surgery. These improvements were maintained, but did not improve further, despite further weight loss at one year.

Parameters	Preop	6 months	Paired t-test Pre-op vs 6mths	12 months	Paired t-test 12mths v 6 mth
BMI kg/m ² (SD)	49(7.3)	36(6.7)		33(7.1)	
Quality of life (QoL)	8(1.4)	9.3(1.3)	$p < 0.001$	9.4(1)	$p = ns$
Beck Depression (BD)	14(7.5)	6.6(7)	$p < 0.001$	8.8(16)	$p = ns$
Hospital Anxiety Depression (HAD)	7.5(6)	2(3)	$p < 0.001$	3.2(6.1)	$p = ns$
Physical Complaints (PC)	60(16)	49(8)	$p < 0.001$	49(8)	$p = ns$
Self Esteem (SE)	79(15)	87(21)	$P = 0.03$	85(18)	$p = ns$
Coping (C)	76(16)	78(16)	$P = 0.4$	80(15)	$p = ns$
Eating Attitudes (EA)	26(19)	20(8)	$P = 0.06$	21(9)	$p = ns$
Moods (M)	72(25)	65(27)	$P = 0.25$	62(20)	$p = ns$

The ACOORH concept against overweight and obesity and related health risk – results on weight control and metabolic regulation after 12 weeks of intervention

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Recent studies have emphasized that meal-replacement strategies are effective in losing weight and fat mass. Furthermore, it has been shown that a meal replacement regimen high in soy protein may be more effective in improving anthropometric and metabolic measures than a fat restricted low calorie diet. To evaluate this, ACOORH (Almased Concept against Overweight and Obesity and Related Health Risk) was designed as a 1-year-multicenter RCT for overweight and obese patients using a low-glycemic, soy-protein-rich product (Almased®). Primary target variable was the total body weight (BW; BMI), secondary targets include body fat (FM), lean body mass, fasting blood glucose and insulin levels (FBI), HbA1c, LDL-C, triglycerides (TG), serum leptin, measures of hemodynamometry endothelial (BP; PWV) and muscle function. More than 500 non-diabetic participants (BMI 27–35 kg/m², 21–65 yrs) with at least one criterion of the metabolic syndrome had been randomized into a telemedically controlled lifestyle (LS) intervention or a meal replacement (MR) regimen for one year. Meanwhile (key date 1st Dec. 2015), paired data for anthropometric and risk factor variables were available after 12 weeks of intervention in 182 participants (31.5 ± 2.37 kg/m², 51.3 ± 9.10 yrs) recruited in the first five of 11 selected study centers (Düsseldorf, Freiburg, Graz, Köln, München). When the outcomes of the MR-group (n = 125) and LS-group (n = 57) were tested for differences as an inter-group comparison, significantly higher differences (p = 0.001) were observed in BW, BMI, WC and FM after meal replacement strategy (MR: -6.8 ± 3.82kg, -2.3 ± 1.39kg/m², -7.5 ± 5.07cm, -5.6 ± 3.92kg; LS: -3.9 ± 3.89kg, -1.3 ± 1.32kg/m², -5.4 ± 4.17cm, -4.0 ± 3.02kg). Significant benefits (p < 0.01) were also analyzed for differences in serum leptin as well as LDL-C levels in the MR group. Considerable improvements in FBI, TG and BP were recognized in both intervention groups. The results demonstrated significant benefits of the meal replacement strategy for weight control (12 weeks of intervention) and weight-related risk factors. **Results:** for weight management (12 months of intervention) as well as all other target variables will be presented in the second half of 2016.

Changes in sedentary behavior during behavioral weight loss programs

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Background and Aims: High levels of sedentary behavior (SB), particularly in prolonged bouts, predict cardiovascular and metabolic risks independent of moderate-to-vigorous physical activity (MVPA). Though research supports an association between MVPA and weight loss, the relationship between SB and weight trajectory remains unknown. Behavioral weight loss programs often focus on increasing MVPA, but make no recommendation for decreasing SB. Research has yet to identify whether individuals in these programs alter their SB and how those changes may relate to changes in weight.

Objectives: Evaluate changes in SB during a BWL program. Examine the associations between change in SB and change in weight.

Materials/Methods: Data were collected from 424 participants at baseline and month six of behavioral weight loss programs. Participants wore an accelerometer for seven days at each assessment. Data were analyzed ac-

cording to cutpoints defined by Troiano (2008). SB was measured as total average minutes per waking hour spent sedentary and average minutes per waking hour engaging in bouts (i.e., 10+ minutes) of sedentary activity.

Results: Participants reduced total SB from baseline to month six (Baseline: M=44.84 min/hour, SD=3.85; month six: M=44.35 min/hour, SD=4.16; p = .03), but not bouts SB (Baseline: M=15.66 min/hour, SD=5.98; month six: M=15.29 min/hour, SD=5.69; p = .17). Changes in MVPA were significantly associated with changes in total SB (r=-.28; p < .01), but not bouts SB (r=-.09; p = .15). Changes in weight were significantly associated with changes in total and bouts SB (rs=.13; ps=.02). When controlling for change in MVPA, change in weight was only significantly associated with bouts SB (p = .04).

Conclusions: Reduced SB may be an important cause or consequence of weight loss. Further investigating this relationship is necessary to inform recommendations for SB during behavioral weight loss.

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Improving Weight Loss Outcomes in Binge Eating Disorder

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Background: Binge eating disorder (BED) is the most prevalent eating disorder and is associated with substantial psychiatric and medical comorbidity. To date, although there exist several effective treatments for reducing binge eating, facilitating clinically significant weight loss in BED remains a challenge. A recent meta-analysis comparing BED patients with matched obese peers found that obese patients with BED lost significantly less weight (M=1.3kg) compared to obese peers without BED (M=10.5kg) across a variety of treatment approaches. We believe the failure of existing treatments is related to 1.) a failure to integrate treatments in a way that achieves both the necessary alterations to the calorie balance to facilitate weight loss without encouraging rigid patterns of dietary restraint that can reduce long-term dietary adherence and promote a re-occurrence of binge eating pathology, and 2.) the failure of both behavioral weight loss programs and cognitive behavioral therapy to address key maintenance factors for BED.

Objectives: Our team is currently developing and piloting an Acceptance-based behavioral weight loss treatment for BED that we believe will address these concerns and improve treatment outcomes.

Methods: The study used an open-pilot trial to assess the ability of an ABBT for BED to improve binge eating pathology and promote weight loss. Patients (n = 19) initially completed a ten week group based treatment designed solely to improve binge eating pathology. Following completion of the initial treatment, overweight or obese patients were invited to do ten additional weeks of ABBT focused on weight.

Results: Results: from generalized linear multilevel modeling revealed significant improvements in depression, quality of life, global eating pathology, and binge frequency (all ps < .05), that were all large in size by the end of the first ten weeks. Data collection from the second phase is ongoing, although initial data suggest high feasibility and acceptability of the treatment program, and early weight loss.

Conclusion: ABBT may be a feasible treatment approach for patients with BED for improve binge eating and promoting weight loss.

Change in Eating Disorder Symptoms, Depression, and Quality of Life During Treatment					
Outcome Measure	Pre-Treatment	Mid-Treatment	Post-Treatment	3-Month Follow-Up	Fixed Effects
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>b (SE_b)</i>
Model Term					
EDE Global	2.64 (0.84)	1.86 (0.71)	1.60 (0.63)	1.58 (0.98)	
Time					-0.16 (.03)***
Time ²					0.01 (.00)***
Binge frequency [‡]	16.82 (8.62)	1.35 (2.00)	3.29 (7.90)	1.33 (2.47)	
Time					-0.77 (.12)***
Time ²					0.08 (.02)***
Time ³					-0.002 (<.01)***
BDI-II	20.37 (11.60)	13.11 (12.21)	11.25 (13.72)	10.33 (10.26)	
Time					-1.26 (.35)***
Time ²					0.04 (.01)**
QOLI	-0.23 (2.00)	--	1.18 (1.89)	1.14 (1.85)	
Time					0.06 (.03)*

Fig. 1. Outcome Data
We could not put this table in the format in the table section, so chose to upload this here to give examples of the type of data we have available.

PO2.241 Midwives' use of person-centred care when caring for pregnant women with obesity

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Background & Aims: Person-centred care (PCC) is based on a partnership between healthcare professional and patient and is associated with increased care satisfaction. The Gothenburg model of PCC (Ekman et al, 2011) includes identifying the person's circumstances (initiating the partnership), shared decision-making regarding care between the person and the healthcare professional(s) (working the partnership) and document the planned and performed care (safeguarding the partnership). The aim of this study was to explore how midwives care for pregnant women with obesity, a patient group who often report care dissatisfaction.

Objectives: The study objective was to explore whether and in what extent midwives include aspects of person-centred care when caring for pregnant women with obesity. **Material & Methods:** Interviews were conducted with 16 community midwives, recruited from nine antenatal clinics, covering the city of Gothenburg, Sweden. All interviews were audio-recorded and analysed for evidence of person-centred care as defined by Ekman et al (2011).

Results: The midwives used different methods to engage women in a discussion about obesity, acknowledging the sensitive nature of the issue. The midwives provided numerous examples of how they, in partnership with a woman, developed feasible health goals for her (such as dietary routines

and physical activities) with the focus being on small behaviour changes. Several midwives admitted to rarely documenting this partnership working, sometimes due to time pressure.

Conclusion: The participants engaged to some extent in person-centred as defined by Ekman et al (2011). Most midwives reported initiating and working the partnership, however only few midwives reported safeguarding the relationship. It is likely that to fully provide PCC, midwives may need more time as well as reflective learning why documenting the personal care plan is important.

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PO2.242

What should Primary Care Obesity Training (PCOT) include? Learning from WHO PCOT development

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Distilling the extensive obesity literature into training programmes is complex. The field is rapidly evolving, yet solutions are perceived as elusive whilst 'common knowledge' prevails. The ubiquitous nature of eating means: 'We all eat: we are all experts' Myths, fads and 'miracles' influence patients and health workers alike. Confidence in discussing obesity and influencing behaviour is low but motivation and confidence are key determinants of behaviour change. Internationally, obesity now matches malnutrition as health priority. Integrating interventions into practice is challenging because of cost, time pressures, unclear incentivisation, lack of tools or complexities around inequalities and the needs of vulnerable or low SES groups. Historically obesity featured rarely throughout clinical training – equally obesity's place within 'routine care' remains contentious. PCOT has neither an established curriculum nor cohort of trained trainers to cascade teaching. Brief intervention messages are still under evaluation. Restating the obvious "eat less and move more", despite obesity's self-evident risks, is ineffective. Indeed superficial or judgmental approaches can damage relationships with obese patients. Evidence reminds GPs not to run 'diet clubs'. Primary care require concise, locally pertinent, communication-skills training that reflects their unique relationship with patients: conveying the impact of weight on health; starting positive discussions; signposting to local services; encouraging long-term (re-)engagement through cycles of predictable weight variation. WHO successfully developed behaviour-change led PCOT workshops that increase staff confidence:- Principles *Why mention obesity? -Health sequelae, population trends, economic factors *Getting good conversations started -Safe openers, avoiding upset *What facts?-Nutritional/PA guidelines, brief interventions, local services *How to achieve it -How behaviours develop and can be influenced *'Yes... but...' -Using motivational interviewing to achieve behaviour change *Goal setting -Measuring what individuals (and health professionals) achieve *Practice: ELearning is insufficient -Consultation skills require practice and feedback; Interactive workshops, case examples, role play Delegates valued practical patient resources, time, networking and discussion, incentive-mechanisms, simple referral systems into allied services and cascade mechanisms to integrate evidence into practice. Might an accreditation system achieve PCOT standardisation?

PO2.243

Orthorexia Nervosa in Healthcare Professionals

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Background: Orthorexia nervosa is defined as an unhealthy obsession with healthy eating and avoiding foods that are considered unhealthy. In view of these considerations, orthorexia may be considered to be a more or less serious personality or behavioral disorder.

Objectives: This study was conducted 104 (92 women and 12 men) individuals in order to evaluating orthorexia nervosa in healthcare professionals.

Material/Methods: Demographic characteristics, health information, dietary habits were taken and orthorexia nervosa-15 (ORTO-15) was applied. Anthropometric measurements (body weight, height) were taken according to the rules.

Results: It was determined that 32.7% of individuals are normal, 67.3% of them are orthorexia. It was stated that 8.6% of doctors, 2.9% dietitians, 41.4% of nurses, 28.6% midwives, 5.7% of medical officer and 12.9% of health workers tends to be orthorexia. Accordingly ORTO-15 test score it was not found significant difference between occupational group ($p > 0.05$). There was no statistically significant relationship between BMI and ORTO-15 scores of individuals ($r = -.136$, $p > 0.05$).

Conclusion: Today, increasing interest in nutrition we see that healthy nutrition perception increase at many individuals especially health care professionals. Importance of healthy nutrition be emphasized at protection and improving of health but it should not become source of stress.

PO2.244

Association between Obesity and Depression in Adolescents and Children

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Depression and obesity are widely spread health problems with major public health implications. Both of diseases are very prevalent especially in adolescents and children groups. Several evidence based studies have shown that obese teens have a higher incidence of mental health problems such as depression, anxiety, and poor self-esteem than non-obese teens. Population based studies of the association between obesity and depression have yielded inconsistent results. Studies have shown that there's no clear, one-way connection between obesity and depression. But it has known that depression can lead to overeating and weight gain, obesity can lead to overwhelming sadness. And also obesity can cause poor self-image, low self-esteem, and social isolation which are contributors to depression. Depression and obesity share common risk factors. Especially some factors lower socioeconomic class and not participating in physical activity can trigger both obesity and depression. And also both diseases can share same symptoms like sleep problems, negative self image, sedentary behavior, changes in appetite and dysregulated food intake. In recent years studies highlighted the possibility link between obesity and depression. Increased inflammation and altered stress system may be possible pathway between obesity and depression. Also, stressful life events such as peer victimization and weight based teasing may be a factor that leads to depression in obese adolescents and children. Further research studies need to explore these factors in adolescents and children so these studies will increase our understanding of obesity-depression associations. Recognizing these pathways and factors are important to know when or how to prevent depression and obesity in adolescents and children.

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PO2.245

Attendance multidisciplinary to the group of women candidates bariatric surgery: Nutritional and psychological profile

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The surgery bariatric has been considered relevant and the last but increasingly common treatment for obesity. Multidisciplinary care prior to surgery is required to achieve the effectiveness and safety of the patient with severe obesity.

Objective: to characterize the nutritional and psychological profiles of women candidates to bariatric surgery, and to evaluate the effectivity of multidisciplinary attendance to the groups of pre bariatric patients which are followed in the Center for Nutrition Universidade the state of São Paulo, Brazil.

Methodology: initial interview containing surveys about nutritional and psychological aspects. Anthropometric data (weight height and waist circumference) and recording of food consumption in 24hs (R24hs) were assessed. Biweekly meetings with multidisciplinary approach were carried out. Group discussions and culinary and motivational workshops were held. Also it was possible to clarify about the surgery and provide patients an increased understanding of the implications of the procedures.

Results: the sample consisted of seventeen women, average age of 37.1 years old. The average weight of 121.08 ± 21.31 kg, classifying them with body mass index (BMI) of 46.13 ± 5.28 kg / m². The majority of patients (16) had grade III obesity. The average waist circumference was 131.9 ± 12.34 cm. As for the average dietary data, energy consumption was 1608,7kcal, and 53.9% from carbohydrates, 20, 2% proteins and 26.9% lipids, 9.6% of them being saturated. No excessive consumption as would be expected were observed. On the other hand, the average fiber consumption, calcium, iron and zinc were below the nutritional recommendations. The psychological intervention aimed at identifying the psychosocial variables related to obesity and encouragement to patients in developing healthier habits.

Conclusion: the interdisciplinary care given by the team of nutrition and psychology proved to be an effective approach in treating these patients, which reported significant associations between emotional axes and feeding behavior. After meetings and information about the surgery it was noted adherence to the instructions given, consequently, improved dietary pattern, reflected in eliminating weight of most patients as well as acceptance of emotional aid and improve the self-esteem of theirs.

PO2.246

The Relationship between Job Stress and Nutrition

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Today, the fact that an individual working for a special organization has to fulfill the roles and tasks that he/she is expected to do by spending most of the time in the workspace to carry out specific goals, has brought out the job stress concept. Job stress, also named as occupational stress and organizational stress, is described by World Health Organization (WHO) as the response of the employee to the demand and pressure that exceed his/her knowledge, skills and coping capacity. According to WHO report, the effects of job stress are grouped under two headings: psychological & social effects, and physiological & physical effects. While psychological-social effects include burnout, mental health—depression and other common mental disorders, social & behavioural health, physiological & physical health effects are associated with musculoskeletal disorders as well as diseases like obesity, cardiovascular diseases, metabolic syndrome and diabetes in which nutrition also play important role. Studies demonstrating the eating

habits and food consumption could change during stress are available in the literature. It is indicated that women are more prone to stress-induced eating than men. Nevertheless, it is determined that individuals exhibit disordered eating behaviours as a coping mechanism to deal with stress. The hyperphagic effect (higher intake of energy, saturated fat and sugar) was predicted to be greater among workers with higher levels of restrained eating. It is indicated that individuals with high work stress consume more fast food, less vegetable and fruits. Intake of various nutrients may be increased or reduced with stress. High job stress positively correlated with intake of energy, saturated fat, salt, sugar, but negatively correlated with carbohydrate, fibre, calcium and vitamin C in some studies. It shouldn't be forgotten that job stress can cause bad eating habits and diseases like obesity and cardiovascular diseases. Therefore, it is important to raise awareness on this issue, to direct individuals to make healthy food choices, and to support stress management to individuals.

PO2.247

Changes in Health Costs Associated with Surgical and Non-surgical Weight Loss Treatment

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Background and Aims: Heads Up is a collaboration between Pennington Biomedical Research Center and the state-managed insurance provider and sponsor, The Louisiana Office of Group Benefits (OGB), to evaluate an intensive medical intervention (IMI) and a weight loss surgery intervention (WLS) for adults with a BMI of 35–60 kg/m². One of the project outcomes and the aim of this study is to examine changes in health costs associated with weight loss treatment. Previous research provides evidence that weight loss via bariatric surgery reduces medical costs but the evidence for nonsurgical weight loss is less convincing. Participants in the nonsurgical IMI treatment in Heads Up lost more weight than in previous studies so another look at post treatment health cost is warranted.

Objectives: Compare changes in health costs (medical and pharmaceutical) three years following treatment for surgical and IMI patients to non-treatment controls (similar medical and demographic profile but no weight loss treatment).

Materials/Methods: Three year cost data are available on 291 participants, 76 of whom received either one of three surgeries: gastric band, gastric bypass, or gastric sleeve. Another 118 received the IMI (liquid low calorie diet, medical management, and behavior therapy). Data on medical charges and pharmaceutical charges were provided for each participant by OGB. Group average annual medical and pharmaceutical cost change per person was determined for surgery patients, IMI participants and controls (n = 97).

Results: Repeated measures ANOVAs indicated average total health cost per person were lower one, two and three years post treatment for surgery and IMI groups compared to controls ($p \leq .004$). Differences in health costs were particularly evident in pharmaceutical cost (see Figure). Costs were lower in surgery and IMI compared to controls ($p \leq .008$) and lower in surgery versus IMI ($p \leq .0001$). The average annual pharmaceutical cost savings per person was \$2,100 less per year for surgery and IMI groups compared to controls.

Conclusion: Bariatric surgery and IMI are associated with savings in health costs.

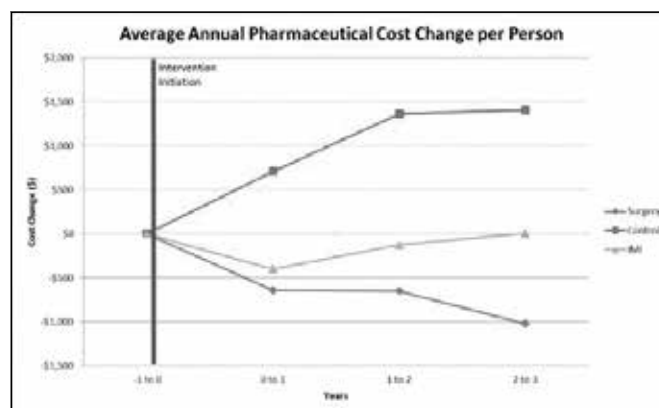


Fig. 1. Average Annual Pharmaceutical Cost Change per person

Using an average baseline cost for all groups the figure displays the average annual cost change per person from baseline to years one, two and three post treatment for surgical and IMI groups and also displays the pharmacy cost changes of controls for comparison

PO2.248

How soon do we achieve glycemic control after bariatric surgery? A comparative study among laparoscopic sleeve gastrectomy, mini gastric bypass, and diverted sleeve gastrectomy with ileal transposition

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Background: Type 2 diabetes mellitus has become a global problem during recent decades, and it is evident that medical treatment is failing to provide adequate control in many obese diabetics.

Objectives: We aimed to perform a prospective comparative cohort study to investigate how soon patients achieve glycemic control after three different surgical options [diverted sleeve gastrectomy with ileal transposition (DSIT), mini gastric bypass (MGB), sleeve gastrectomy (SG)] within the first 30 days postoperatively.

Materials & Methods: Medical charts of 251 obese, type 2 diabetic patients with a mean age of 52.84 ± 8.52 were used to assess daily changes in weight and plasma glucose levels. The patients had a mean diabetic duration of 13.09 ± 7.54 years and a mean HbA1c of $8.82 \pm 1.58\%$. Groups consisted of the DSIT (n = 109), MGB (n = 93), and SG (n = 49).

Results: In the morning of surgery, mean plasma glucose levels were 177.63 ± 51.3 mg/dL, while on the 30th day, it was 131.35 ± 28.7 mg/dL ($p < 0.05$). According to the type of surgery, SG group never achieved a mean plasma glucose level < 130 mg/dL. Mean plasma glucose level reaching below 130 mg/dL was achieved in the evening of 29th day for DSIT, and in the evening of day 30 for MGB.

Conclusion: We observed differences in glycemic control following different types of surgery within the first 30 postoperative days. Patients in the SG group did not achieve a mean plasma glucose level < 130 mg/dL. Mean plasma glucose levels < 130 mg/dL were achieved on the evening of day 29 for DSIT and on the evening of day 30 for the MGB. Multivariate logistic regression analysis identified preoperative BMI and postprandial C-peptide level as independent predictors of postoperative glycemic control in the DSIT group.

PO2.249

Early efficacy of gastric stimulation using the DIAMOND System in the glycemic control of obese patients with type 2 diabetes

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Introduction: Type 2 diabetes already affects over 500 million people, of which 60% are obese. A part of that population can benefit from a fully reversible minimally invasive surgical procedure which will improve their metabolic control and help them lose weight. Multiple clinical studies designed to evaluate the DIAMOND (TANTALUS) System for the treatment of obesity, type 2 diabetes and co-morbid conditions have been and are currently being conducted worldwide.

Aim: The main objectives of this study are to evaluate the early efficacy of gastric stimulation (GCM) using the DIAMOND System in the improvement of glycemic control measured by changes in HbA1c. The effects of GCM on weight loss, BMI, reduction of the weight circumference and metabolic parameters other than HbA1c will also be evaluated.

Material/Methods: A total of 15 adult patients with type 2 diabetes were surgically treated at the Department for Minimally Invasive Surgery, Clinic for Digestive Surgery in Belgrade using the DIAMOND System from January 2014 to December 2015. Out of total number of patients, 10 finished week 16 visit and were enrolled in this prospective cohort study.

Results: after 16 weeks body weight decreased 7.83kg (122.09 ± 27.9 vs. 114.26 ± 15.8kg), waist circumference decreased 4.62cm (128.7 ± 13.3 vs. 124.88 ± 13.7cm), BMI was lower 2.11kg/m² (39.5 ± 5.5 vs. 37.6 ± 4.2kg/m²). There was decrease in blood glucose 2.21mmol/l (10.89 ± 6.8 vs. 8.68 ± 6.5mmol/l), in serum insulin 4.49mIU/L (24.95 ± 32 vs. 20.46 ± 11.6mIU/L), in HbA1c 0.89% (8.77 ± 0.8 vs. 7.88 ± 3.5). Change in metabolic parameters was better in patients with more significant weight loss. In two patients, there was not change in anthropometric and metabolic parameters and they were marked as “non-responders”.

Conclusion: gastric stimulation using the DIAMOND System improved synchronisation between food intake and post meal glucose levels, enhanced natural hormone secretion and cause earlier satiation with positive effect in weight loss.

PO2.250

CVD risk markers after bariatric surgery – Elevated TMAO but decreased acyl-carnitine

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Background & Aims: Cardiovascular disease (CVD) represents a leading cause of death world-wide and identification of reliable biomarkers to predict patients at risk is of major importance. Convincing data has suggested that elevated serum levels of trimethylamine-N-oxide (TMAO) represent a marker of increased risk of CVD as well as of type 2 diabetes (T2D) 1. Nevertheless, there are controversies on this matter and dietary sources normally associated with reduced risk of CVD may in fact be a source of increased serum TMAO levels. Aim To investigate how serum TMAO and related metabolites are affected by Roux-en-Y Gastric Bypass surgery, an intervention associated with marked reduction of BMI, improvement of metabolism and reduced risk for CVD.

Objectives: To measure serum levels of TMAO before and after bariatric surgery and in lean versus obese individuals in order to investigate how they are associated with other biochemical and anthropometric measurements

Material & Methods: Plasma TMAO, trimethyllysine (TML) as well as carnitine, choline, betaine and their respective acyl-CoA derivatives were analyzed by liquid chromatography-mass spectrometry 2.

Results: We found that one year after bariatric surgery of morbidly obese patients (N = 48), TMAO levels were markedly elevated and in the range of the levels found in lean controls (N = 40). We also found changes in a number of other metabolites associated with carnitine and one-carbon metabolism. In particular, we found that bariatric surgery reduced levels of palmitoyl-carnitine.

Conclusion: Our results suggest that TMAO is not a relevant marker for CVD risk in the setting of morbid obesity. The data also demonstrate that bariatric surgery is associated with markers of improved mitochondrial function.

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PO2.251

The impact of the degree of obesity on correlation of obesity indices and cardiometabolic risk factors in severe obese women

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Objective: According to previous reports, moderate weight loss did not ameliorate inflammatory marker of cardiovascular disease in severe obese patients. The purpose of this study was to investigate the influence of the degree of obesity in correlation of obesity indices and cardiovascular risk factors.

Design and Methods: Body mass index (BMI), waist circumference (WC), fasting insulin, fasting glucose, lipids, visceral adipose tissue (VAT) area determined by computed tomography were measured in 113 obese female subjects for women at three university hospitals. The correlations between obesity indices and risk factors were analyzed in obese subgroups who were divided by sequential cut-off points of obesity indices.

Results: When cut-off point of BMI was ≥ 28 kg/m², the correlation between BMI and triglyceride (TG)/high density lipoprotein – cholesterol (HDL-C) was no longer existed and when it was ≥ 29 kg/m², the correlations with low density lipoprotein – cholesterol (LDL-C)/HDL-C, total cholesterol (TC)/HDL-C and VAT were no longer existed. And correlations between BMI and all five factors were no longer existed when cut-off point was ≥ 30 kg/m². Correlation of WC to homeostatic model assessment-estimated insulin resistance and LDL-C/HDL-C was no longer existed with WC ≥ 85 cm and when cut-off value was ≥ 90 cm, the correlations with TG/HDL, TC/HDL and VAT were no longer existed.

Conclusion: Our data suggest that moderate weight-loss goal may not be enough to ameliorate cardiovascular and metabolic markers in severe obese patients. Therefore, we need to recommend initial degree of obesity-based individualized weight-loss goal to improve health benefits.

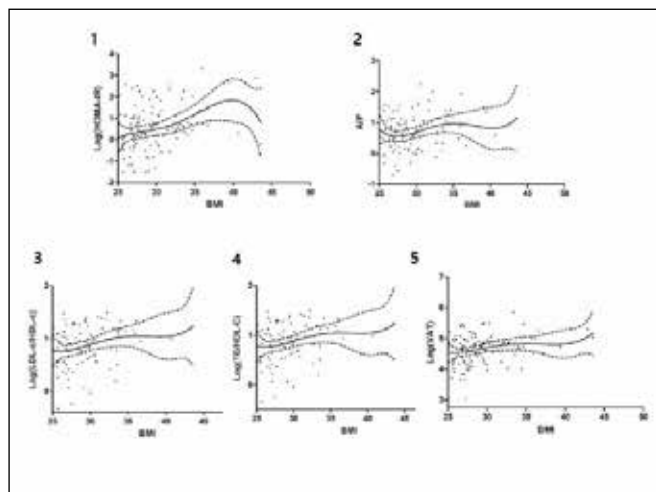


Fig 1. Scatter plots and nonlinear regression curves showing relations between BMI and cardiometabolic risk factors. solid line, nonlinear regression curve; dotted line, 95% confidence band. BMI, body mass index; HOMA-IR, homeostatic model assessment – insulin resistance; AIP, atherogenic index of plasma; TG, triglyceride; HDL-C, high density lipoprotein-cholesterol; TC, total cholesterol; LDL-C, low density lipoprotein- cholesterol; VAT, visceral adipose tissue.

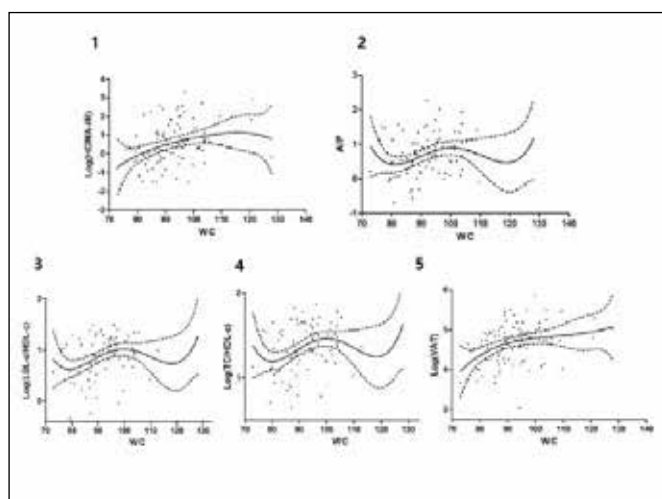


Fig 2. Scatter plots and nonlinear regression curves showing relations between WC and cardiometabolic risk factors. solid line, nonlinear regression curve; dotted line, 95% confidence band. WC, waist circumference; HOMA-IR, homeostatic model assessment insulin resistance; AIP, atherogenic index of plasma; TG, triglyceride; HDL-C, high density lipoprotein-cholesterol; TC, total cholesterol; LDL-C, low density lipoprotein- cholesterol; VAT, visceral adipose tissue.

PO2.252

The Determination of Fecal Transplantation In Gastrointestinal Diseases

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In recent years, most studies have investigated the effect of gut microbiota on chronic diseases such as obesity, type 2 diabetes. A lot of studies have been started to research microorganism's species in gut microbiome with increased interest in microbiome. The healthy gut microbiome are predominant Firmicutes and Bacteroidetes. The microbiota in healthy individuals is different than patients who have gastrointestinal system (GIS) diseases. It may be decrease bacterial diversity and count in patients'gut

flora than healthy population. For example, Bacteroides and Firmicutes may be decrease in GIS diseases. Fecal microbiota transplantation (FMT) is the term used to describe the delivery of stool from a healthy donor into a patient, either by enema, colonoscopy, or via the upper gastrointestinal (GI) tract (oral capsules, nasogastric, nasoduodenal or nasoenteric tube, or endoscopy) Currently, FMT is applied for treatment of gastrointestinal diseases such as irritable bowel syndrome [IBS] and inflammatory bowel disease [IBD]. FMT has been related with altering microbiome, inflammation or dysbiosis. It was stated that this method induce decreasing symptoms and inflammation in GIS diseases (ulcerative colitis, chron's) after fecal infusion. Some studies showed that %100 resolution in IBD and IBS without relapsing or death. Otherwise FMT might cause fever, bloating and constipation in individuals. In addition FMT procedure might cause side effects such as aspiration. The data of FMT for GIS diseases are limited. It is need that a consensus about FMT such as donor selection, stoll preparation and transplantation for FMT standardization. Therefore it will be important to research in long term and follow-up human studies for current recommendation.

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PO2.253

Morbid Obesity: Values involved in the decision for Bariatric Surgery

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Background: Morbid obesity puts the individual in a position of great vulnerability in an environment in which social constraints and economic and psychological limitations place him/her in a moderate to severe disability. In this context the health value is generally key when taking the decision whether an obese patient is to undergo elective surgery and bring about permanent changes in their lifestyle.

Aim: Our intention is to explore the world of values of patients in the bariatric surgery protocol Method. Women and men applying for inclusion in bariatric surgery protocol and who meet the criteria are studied. An analogue scale questionnaire is used to evaluate the prioritization of quality of life, professional and social success, moral autonomy, mental strength, beauty, care for others and perceived health. Patients fill in the questionnaire in non-medical space and with time for clarification and reflection on these values

Results: The preliminary data has produced a wide variability of results. Highlighting the key results, 57% of the population ranks health at the top of their scale of values and for 28% quality of life represents the central value. Being able to take ones own decisions is the second priority for 71% of patients. Relationships, social success and body image are gender related and are perceived as less important.

Conclusions: 1. In the decision making process of the patient with morbid obesity, the desire to maintain greater independence or improve their quality of life is as important as the improvement of their physical condition or associated diseases 2. The approach to the patient with morbid obesity should cover both biology and biography. Knowing their expectations might contribute to achieving better results after surgery.

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PO2.254

The First Procedureless Gastric Balloon for Weight Loss: Results: From a Multi-Center, Prospective Study Evaluating Safety, Efficacy, Metabolic Parameters, and Quality of Life

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Background: Traditional gastric balloons for weight loss require endoscopy for placement and removal. Elipse™ (Allurion Technologies, Wellesley, MA USA) is the first procedureless gastric balloon. The balloon is swallowed, resides in the stomach for 4 months, and is then excreted.

Methods: Each patient swallowed one Elipse™ device, which was filled with 550mL of filling fluid through a thin delivery catheter that was then removed. Each device was designed to remain in the stomach for 4 months and then reproducibly open and pass. Weight was measured every 2 weeks, and metabolic parameters were assessed at baseline and at trial exit. The Impact of Weight on Quality of Life-Lite (IWQOL-Lite) questionnaire was administered at baseline and trial exit to measure the effects of weight loss on Physical Function (PF), Self-Esteem (SE), Sexual Life (SL), Public Distress (PD), Work (W), and Overall (O).

Results: Thirty-four patients were enrolled with a mean BMI of 34.4 kg/m². All 34 patients successfully swallowed the Elipse™ device. As expected with balloon therapy, some patients experienced nausea, vomiting, and abdominal cramps during the first 48 hours. All adverse events were either self-limiting or resolved with medication. At 4 months, the mean weight loss was 10kg, percent total body weight loss was 9.5%, and percent excess weight loss was 37.2%. All balloons were safely excreted. Mean waist circumference and hemoglobin A1c (HgbA1c) were reduced by 8cm and -0.16%, respectively. Improvements were also seen in triglycerides and LDL. At trial exit, IWQOL-Lite mean scores improved across all domains: +13.7, +17.7, +6.0, +7.7, +7.9, and +11.9 for PF, SE, SL, PD, W, and O, respectively. An improvement of greater than 7.7 in any domain is considered statistically significant.

Conclusions: These results demonstrate clinically significant weight loss with Elipse™, the first procedureless gastric balloon. The weight loss observed was similar to that seen in prior studies of endoscopically placed balloons. There were no serious adverse events. In addition, Elipse™ therapy led to a significant improvement in waist circumference, HgbA1c, and overall quality of life.

PO2.255

Diagnosis & Management Of Gastroesophageal Cancer After GASTRIC BYPASS

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Surgery for obesity is the only approved treatment that carries a long term result in term of weight loss, resolution of comorbidities and decreasing the risk of obesity related neoplasms. With the emerging era of bariatric surgery, we are confronted by taking in charge several gastrointestinal cancers, occurring years after restrictive or malabsorptive procedures for obesity. We present the case of a 58 y o male patient, with a previous history of a Redo open gastric bypass, diagnosed with Siewert II adenocarcinoma of the Gastro Esophageal Junction. We discuss the diagnostic modalities, alternative therapies and the management of postoperative complications. The relation between bariatric surgery and esophageal/

gastric malignancies is reviewed, along with the potential risks. Controversies and debates of different techniques of esophagectomy and/or gastrectomy with extent of lymphadenectomy are also discussed, in order to optimize an adequate tailored technique according to the previously performed bariatric surgery.

PO2.256

Baseline data of older obese diabetes patients subtypes participating in a lifestyle program and protein supplementation trial (PROBE)

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Background and Aims: Type 2 diabetic mellitus (T2DM) patients have low glycemic control due to disturbance of organ function. Muscle or liver insulin resistance or poor activity of pancreatic cells, result in increased blood glucose and insulin levels and inadequate disposal of glucose. The blood glucose and insulin curve after an Oral Glucose Tolerance Test (OGTT) differ in height of response and speed of clearance, depending on specific organ failure. We developed a mathematical model to specify subgroups of diabetic patients based on their OGTT blood glucose and insulin data.

Objectives: To study baseline OGTT data of diabetes patients to differentiate subtypes related to specific organ function controlling glucose metabolism.

Materials/Methods: Baseline blood glucose and insulin response data after an OGTT were used in our model, to identify different subtypes of diabetes patients. Differences between the diabetes patient subtypes were statistically evaluated using ANOVA mixed models.

Results: Data of 46 subjects (age 66 ± 5 yrs; BMI 33.8 ± 5.3 kg.m-2; 20 females and 26 males) were used in the analysis. Most patients (n = 39) matched a phenotype with a poor beta cell activity in combination with hepatic and muscle insulin resistance. Only seven subjects showed a combination of 'hepatic and muscle insulin resistance' (HMIR) without poor beta cell activity. No subjects with only hepatic or only muscle insulin resistance were present. Between the two subgroups some differences related to fat metabolism were found. The adipose tissue insulin resistance index (ATIRI), visceral fat area as well as waist circumference showed tendencies to differentiate between the subtypes (p < 0.1). Also fasting baseline FFA levels differed between subgroups (poor beta 0.69 ± 0.15 versus HMIR 0.54 ± 0.07 mmol/L, p < 0.05).

Conclusion: Most subjects already showed severe T2DM and in the present preliminary data two subtypes were detected. Whether body composition and especially abdominal fat mass accumulation is related to organ function and worsening of T2DM will be examined in more detail when the full dataset is available.

Reference:

Bianco-Rojo et al., 2015: The insulin resistance phenotype (muscle or liver) interacts with the type of diet to determine changes in disposition index after 2 years of intervention: the CORDIOPREV-DIAB randomized clinical trial. Diabetologia, PMID:26474775

PO2.257

Do we do everything daily for preserving muscle mass in obese people?

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Background: Sarcopenia is a syndrome characterized by loss of muscle mass associated with reduced muscle strength and/ or reduced functional

capacity. Coexistence of sarcopenia and obesity creates a new category of obesity – sarcopenic obesity (SO), which may cause numerous negative consequences. The ageing of our population is producing an increase of the prevalence of SO, related with the age in addition to other factors related to obesity.

Objective: to describe and analyze the body composition in obese patients: Body fat percentage (FM) and muscle mass (MM) in a group of obese from Obesity Unit in Madrid.

Method: Data are based on 400 patients, who were examined in 2015 (122 men, 278 women) aged 48,7yr ($\pm 13,9$) and BMI 39.1 ($\pm 6,7$). Body composition characteristics assessed using bioelectrical impedance analysis (BIA). We applied the index %MM/%FM* (cutoff points -1.78 for men and -0,97 for women).

Results: There was difference in the parameters of %MM in men aged 35–65 yr (mean 60) and the women (mean 51) ($p = 0,000$) while than in men aged ≥ 65 years, the percentage decreases significantly (mean 52) and women increases (mean 57) ($p = 0,013$). Simultaneously loss is significantly more marked in men ≥ 40 BMI than the women (51% vs 48% respectively) ($p = 0,002$). The 42% of the patients present risk of SO, applied the index described above.

Conclusion: The therapeutic intervention 50–65 years should preserving muscle mass but not only women, also men, as a priority. Based on this study the knowing precisely body composition is important for giving a suitable nutritional assessment, as well as the develop of appropriate interventions: Dietary interventions and more exercise programs containing strength and aerobic exercise in combination. *

Reference:

López JJ, Olatz I: Influence of a very low calori diet in the relation Muscle Mass / Fat Mass in obese patients. (Influencia de una dieta hipocalórica modificada sobre la relación masa muscular/Masa Grasa en Pacientes obesos). Senpe Congress 2015

PO2.258

Connections between body fat percent and anthropometric parameters in overweight and obese patients

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Aim: To study the value of body fat percent (BFP) in connection with BMI and other anthropometric parameters in overweight and obese patients.

Material/Method: n: 252 (male n:104 y:44.7 (10.2) female n:148 y:45.4 (10.7) The mean of body weight in male:127.3 (SD:27.3) in female:105.3 (23.8) BMI male:40.5 (8.3) female:39.4 (8.7) Waist circumference male:127.3 (16.8) female:114.1 (16.2) Waist/Hip male:0.985 (0.199) female:0.864 (0.154) Waist/height male:1.02 (0.107) female:1.11 (0.15) BFP male:35.8 (7.9) female:44,6 (6,9). The body analysis was made by InBody720.

Results: In BFP categories 86.5% of male were above the highest category (>27.0) and 73.0% of female (>40.0). In waist/height ratio 83.7% of male (>0.63 , max value: 0.96) and 88.5% of female (>0.58 , max value: 0.97) in waist circumference 95.2% of male (>102 , max value: 177) and 93.9% of female (>88 , max value: 154) were above the highest category. Correlations with BFP Body weight (kg) male $r:0.690$ ($P < 0.001$) female $r:0.752$ ($P < 0.001$), Waist circumference (cm) male $r:0.769$ ($P < 0.001$) female $r:0.697$ ($P < 0.001$), Hip circumference (cm) male $r:0.726$ ($P < 0.001$) female $r:0.823$ ($P < 0.001$), BMI (kg/m^2) male $r:0.847$ ($P < 0.001$) female $r:0.863$ ($P < 0.001$), log BMI male $r:0.861$ ($P < 0.001$) female $r:0.877$ ($P < 0.001$), Waist/Hip ratio male $r:0.106$ ($P = 0.30$) female $r:-0.116$ ($P = 0.19$), Waist/Height ratio male $r:0.852$ ($P < 0.001$) female $r:0.737$ ($P < 0.001$) The strongest correlations are between body fat percent and log BMI in both genders (male: 0.861 and female: 0.877). The waist/height ratio shows strong correlation with BFP in male (0.852).

Conclusion: Our results emphasize the necessity of further categories in body fat percent, waist circumference and waist/height ratio in case of morbid obesity.

PO2.259

Primary non-closure of mesenteric defects in laparoscopic Roux- en-Y gastric bypass: Reoperations and intraoperative findings in 146 patients

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Background: Internal hernias (IH) after laparoscopic Roux-en-Y gastric bypass (LRYGB) have been reported with an incidence of 11%. IH can lead to bowel incarceration and potentially bowel necrosis. The aim of this study was to analyze reoperations and intraoperative findings in a cohort of patients with unclosed mesenteric defects.

Methods: From a prospective database of patients with LRYGB, we selected as primary cohort patients with non-closure of mesenteric defects and abdominal reoperation for analysis. The data included pre-, intra- and post-operative findings, computed tomogram results and laboratory test results. This group underwent a very very long limb LRYGB, at that time the institutional standard technique. Additionally, a more recently operated cohort with primary closure of mesenteric defects was also analyzed.

Results: We identified 146 patients with primary non-closure and reoperation, mean age of 43.8 years. The main indication for reoperation was unclear abdominal pain in 119 patients with 27 patients undergoing a reoperation for other reasons (weight regain, prophylactic surgical inspection of mesenteric defects). Median time and mean excess weight loss from RYGB to reoperation were 41.1 months and 62.7%, respectively. The incidence of IH was 14.4%, with all patients with an IH being symptomatic. Conversion rate from laparoscopic to open surgery was 5.5%, mortality 0.7% and morbidity 3.4%. Thirty-one patients underwent a second re-look laparoscopy. Eleven patients had recurrent open mesenteric defects. Three hundred and sixteen patients who underwent primary closure of the mesenteric defects had a reoperation rate of 13.6% and an IH rate of 0.6%.

Conclusion: The incidence of IH in patients without closure of mesenteric defects and reoperation is high and substantially higher compared to patients with primary closure of mesenteric defects. Patients with or without closure of mesenteric defects following LRYGB with acute, chronic or recurrent pain should be referred to a bariatric surgeon for diagnostic laparoscopy.

PO2.260

Prospective evaluation of the efficacy of ursodeoxycholic acid on gallstone formation after Roux-en-Y gastric bypass and sleeve gastrectomy

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Background: Despite recommendations advocating the use of ursodeoxycholic acid (UDCA) in prevention of gallstone formation after gastric bypass (RYGBP), this practice is still heterogeneous. In addition, only one study has assessed the efficacy of the use of UDCA after sleeve gastrectomy (SG) with inconclusive results.

Objectives: To compare the incidence of cholelithiasis (CL) after RYGBP and SG between patients treated and non-treated with UDCA after surgery.

Methods: Since 2008, a postoperative ultrasound monitoring was proposed in all patients without previous cholecystectomy after RYGBP and SG in our institution. All patients who had CL or cholecystectomy during the follow-up (FU), or had at least performed one ultrasound at one year or more after surgery, were included. We started to systematically prescribe UDCA during the first 6 months after surgery, in February 2012 for RYGBP and in October 2013 for SG. UDCA (500 mg/day) was given in 1 or 2 daily doses for RYGBP and once a day for SG.

Results: 50 CL (33% of the subjects) occurred in the 153 non-treated RYGBP (mean FU: 38.3 ± 10.9 months) and 13 (25%) in the 50 non-treated SG (mean FU: 22.5 ± 16.0 months). In treated subjects, the incidence of CL was reduced to 0 in the 28 SG ($p = 0.003$ vs. untreated, mean FU: 14.3 ± 5.3 months), to 9.5% in the 84 RYGBP treated with 250 mg twice a day ($p = 0.002$ vs. untreated, mean FU: 22.7 ± 10.9 months), but only to 19.1% in the 89 RYGBP treated with 500 mg once a day ($p = 0.111$ vs. untreated, mean FU: 12.8 ± 2.9 months).

Conclusion: UDCA at 500 mg once a day for 6 months after surgery is efficient to prevent CL after SG, but the 2 daily doses administration seems to be more effective to prevent CL after RYGBP. The efficacy of UDCA after SG and RYGBP should be confirmed at a longer follow-up.

PO2.261

10-year Experience with Laparoscopic Gastric Banding for Morbid Obesity

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Background & Aims: Laparoscopic gastric banding (LGB) was very popular in the treatment of morbid obesity worldwide. Despite its safety and efficacy in short-term weight loss it is not a risk-free procedure. Many complications are common in medium and long-term with frequent need for further surgical interventions.

Objectives: Review the long-term complications presented by our patients. **Material & Methods:** Retrospective analysis was performed on patients undergoing LGB between 2005 and 2014 at a single medical center in Portugal. Patients were reassessed in consult over 5 years, for weight loss and postoperative complications, which include band slippage or prolapse, port or tubing malfunctions, pouch dilation, and band erosion, among others.

Results: A total of 91 LGB were performed between 2005 and 2014, 82% women and 18% man, with a mean body mass index (BMI) of 45 kg/m^2 . Complications were recorded, 23 patients had a gastric band slippage, 9 a port malfunction and 7 an oesophageal dilatation. New surgery was necessary in 61 patients, by dysfunction of the band and treatment failure and 58 of them underwent new bariatric intervention.

Conclusion: Gastric band is losing popularity among bariatric surgeons in recent years. There are frequent complaints that interfere with everyday quality of life of patients, often occurring a weight loss inferior to desire, or even, a regained weight and a decrease in quality of life. In these patients the option will be the revisional surgery. In our institution placement of gastric bands has been declining over the years. We believe LGB has a poor outcome in quality of life and frequent need a revisional surgery and we consider laparoscopic gastric bypass as the gold standard of bariatric surgery.

References:

Suter, M., Calmes, J. M., Paroz, A., & Giusti, V. (2006). A 10-year experience with laparoscopic gastric banding for morbid obesity: high long-term complication and failure rates. *Obesity surgery*, 16(7), 829–835.

Tolonen, P., Victorzon, M., & Mäkelä, J. (2008). 11-year experience with laparoscopic adjustable gastric banding for morbid obesity—what happened to the first 123 patients?. *Obesity surgery*, 18(3), 251–255.

PO2.262

Alternative treatment for gastric ulcers treatment with adjustable intragastric balloon

De Souza, T. F.; Marques, L. M.; Grecco, E.; Garcia, V. G.; Freitas Jr., C. E.; Dos Passos Neto, M. G.

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Introduction. Intragastric balloons (IB) are associated with early period intolerance, diminished effect within 3–4 months, and bowel obstruction risk mandating removal at 6 months. The introduction of an adjustable

intragastric balloon (AIB) could improve comfort and offer greater efficacy. A migration prevention function, safely enabling prolonged implantation, could improve efficacy and weight maintenance post-extraction. Overall complication rate in the IB was 70/2,515 (2.8%); gastric perforation, gastric obstructions, balloon rupture, esophagitis and gastric ulcer ($n = 5$; 0.2%). In our service we observed a greater number of ulcers with use of AIB, possibly due to the pressure exerted on the gastric mucosa by the balloon adjustment catheter. **Case Report.** A 38-year-old, male, obese grade 2, smoker, hypertensive, with anti-obesity statement with implantation of an adjustable intragastric balloon (AIB). After insertion the balloon was inflated with 600 ml methylene blue solution. Patient did not adhere satisfactorily to treatment with frequent missed appointments and not properly followed the drug and dietary guidelines. After 4 months of treatment showed episodes of severe abdominal pain. Endoscopy being held who noted 3 gastric ulcers in the proximal region of the gastric body for the greater curvature, one of them in close contact with the balloon catheter adjustment without complication. Conducted drug and dietary guidance that resulted in partial improvement of symptoms, performing endoscopy after 30 days of drug treatment. There was persistent ulcers and permanent contact of the catheter. Chosen to mobilize the balloon with the gastroscope and foreign body forceps, but the balloon had addiction position. Clipping took place the catheter in opposite wall to ulcers in the lesser curvature, keeping dietary and drug guidelines. The patient showed improvement of symptoms and a new endoscopy showed no more ulcers.

Conclusion. The repositioning of the intragastric balloon catheter fitting metal clip in the treatment of gastric ulcer during use AIB proved to be safe and effective. However it is still needed randomized clinical trials to prove the effectiveness of the method.

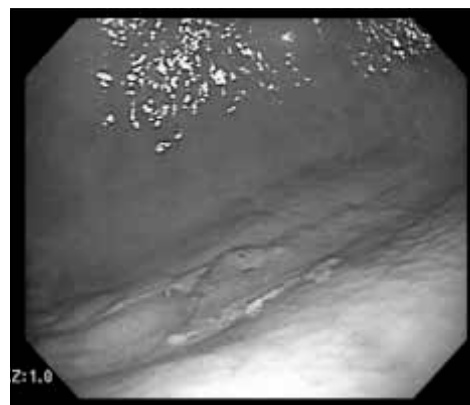


Fig. 1. Ulcers in the gastric body



Fig. 2. Clipping took place the catheter in opposite wall to ulcers in the lesser curvature

PO2.263

Weight loss effect induced by balloon intragastric related to dietary guidelines in patients with hepatic steatosis

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Introduction: Obesity is a condition in which a person's weight is higher than that consistent with the maintenance of health and well-being. In Brazil it is estimated that 40% of the population is overweighted, and obesity accounts for about 80,000 deaths per year. **Objective:** Evaluate the effect of weight loss induced by intragastric balloon associated with dietary counseling in patients with hepatic steatosis confirmed by abdominal ultrasonography.

Results: 46 patients, 36 women and 10 men were studied. At baseline the mean and SD age was 34.7 ± 10.5 years, weight of 117.1 ± 29.5 , and BMI of 42.3 ± 9.9 . Patients were distributed in two groups: those who obtained a reduction of steatosis at study completion (success group – SG, 21 patients) and those in which steatosis was unchanged or worsened (failure group – FG, 25 patients). The average percentage of weight loss in both groups did not differ significantly, as well as the age and sex ($p > 0.05$). In respect to HDL, SG had a significant increase in its values ($p = 0.037$) at the end of the study. The values of AST, ALT and alkaline phosphatase did not differ significantly in any of the established comparisons. The gamma GT showed a significant reduction of its values in SG ($p = 0.006$).

Conclusion: Treatment with intragastric balloon was associated with a 45.6% success rate in the decrease of hepatic steatosis. In the success group the reduction of steatosis was accompanied by a significant reduction of LDL, blood glucose, plasma insulin and gamma GT and a significant increase in HDL.

PO2.264

Divergence of Patient and Clinician Perceptions of Obesity and Weight Management

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Background and Aim: Obesity is a chronic disease associated with significant morbidity, for which few affected individuals receive adequate medical care. The ACTION (Awareness, Care & Treatment In Obesity MaNagement) study was designed to identify barriers reported by people with obesity (PWO) and clinicians that may hinder the initiation of such care.

Methods: Focus groups including 43 PWO (class I: N = 14; class II: N = 13; class III: N = 16) and individual interviews with 24 clinicians (12 primary care providers and 12 obesity specialists) were conducted, transcribed, and coded thematically.

Results: In total, 75% of PWO perceived themselves as 'healthy', although nearly three-quarters had obesity-related comorbidities. While PWO and clinicians considered obesity a combination of disease and lifestyle, their primary emphases differed widely; 65% of PWO considered obesity primarily a lifestyle issue, and 88% of clinicians considered it a disease. Motivation was perceived as a key barrier to weight loss by both PWO and clinicians (77% vs. 75%, respectively); limited patient understanding of their condition less so (35% vs. 42%). Relative to clinicians, PWO more often cited barriers of food habits (88% vs. 38%), social relationships (79% vs. 38%) and feeling deprived while dieting (56% vs. 8%), and less often

cited limited patient understanding of how to lose weight (9% vs. 58%). Importantly, PWO indicated that developing health complications or receiving a 'wake-up call' in relation to their health would motivate them to address their obesity.

Conclusions: Perceptions of obesity appear to vary between PWO and clinicians. This discordance may be a barrier to effective communication and treatment, and thus contribute to suboptimal patient-clinician interactions. This qualitative association provides the basis for quantitative examination of these perceptions and their causes, the understanding of which could enhance patient-clinician collaboration in the treatment of obesity.

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PO2.265

The RAQET Study: The effect of eating a popsicle diRectly After bariatric surgery on the Quality of patiEnT Recovery; a randomised controlled trial

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Background: Quality of recovery could be influenced positively if there is less Post Operative Sore Throat (POST). Eating a popsicle might soften this sore throat. Especially for bariatric surgery early recovery is important. Adding this to the postoperative protocol could be beneficial. Our hypothesis is that offering a popsicle in the recovery room to patients after bariatric surgery will decrease POST and will increase quality of postoperative recovery

Objectives: To assess the effect of eating a popsicle directly after bariatric surgery on the prevalence of POST and quality of postoperative recovery **Materials & Methods:** Patients undergoing elective bariatric surgery, between the 23rd of February 2015 and the 3rd of April, were randomised to either the popsicle group or control group. Primary endpoint was the incidence of POST and secondly if a reduction in POST influences quality of recovery at the first day postoperative measured with the Bariatric Quality Of Recovery (BQoR) questionnaire.

Results: One hundred and thirty three patients were assessed for eligibility. For the final analysis, 44 patients in the intervention and 65 in the control group were available. Eating a popsicle after bariatric surgery had no significant effect on the incidence of POST. Significant effects (in favour of the popsicle group) were seen in muscle pain score ($p = 0.047$) and sore mouth score ($p = 0.012$). Popsicle intragroup analysis revealed that eating the whole popsicle (compared to partially eating the popsicle) has positive effects on nausea ($p = 0.059$), feeling cold ($p = 0.008$) and mean total Comfort score ($p = 0.011$). Of the patients who became nauseous and/or had to vomit because of the popsicle, had more severe pain ($p = 0.04$) and the mean Pain score was higher ($p = 0.09$).

Conclusion: The present study demonstrates that offering a popsicle early during recovery after bariatric surgery is feasible without adverse effects. Although eating popsicle did not reduce postoperative sore throat. There are possible beneficial effects, such as reduced muscle pains and less sore mouth that may enhance the quality of recovery. More research is necessary to further substantiate the effect of eating popsicles on the quality of recovery in this patient population.

Growth Monitoring In Children With Type 1 Diabetes

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Background: Growth is the most important feature of the continuum of childhood. However, any of disease may cause the interruption during the growth. Especially if the diagnosis of chronic diseases time delays and/or not good treated disrupt the growth and development. For this reason it is important to growth monitoring of diabetes children.

Objectives: The aims of this study were to assess the physical growth in diabetic children according to diagnosed age

Material/Methods: We conducted a retrospective study including 2–16 years of ages 86 children (44 males and 42 females). Anthropometric measurements (body weight and height) of children were reached from their file of children at hospital. We used five measurements (at diagnosis year and after 4 years) of children.

Results: Children 2–5 years, 6–10 years and 11–16 years of age at diagnosis were found 19.8%, 51.2% and 29.1%, respectively. One year after diagnosis the thinnes ratio decreased from 21% to 3.5% in children and this rate has been maintained. Besides this, a year after diagnosis the proportion of normal weight children increased 64% to 69.8% and end of the follow-up ratio reached 74.4%. The rate of overweight at diagnosis was 11.6% and after the first year it was 24.4% and despite the increase in the second year it was 27.9%. In the subsequent controls it was decreased to 18.6%. The differences between weight, height and BMI measurements was found significant in male and female groups according to all age groups ($p < 0.05$). It was found that growth changes (weight and height changes) tend to increase in both gender.

Conclusion: Growth monitoring of diabetic children should be done regularly and the children should be followed up closely for development of prevent short stature and imbalance weight gain or loss.

Interventions targeted at primary care practitioners to improve the identification and referral of patients with co-morbid obesity: A realist review

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Background & Aims: More needs to be done in primary care to improve the identification and referral of adults with “high risk” obesity – i.e. obesity with related co-morbidities (1). The aim of this realist review is to inform the development of a theory-driven, evidence-based intervention targeted at primary care practitioners to improve the management of co-morbid obesity.

Objectives: (i) To identify the underlying ‘programme theory’ of interventions targeted at primary care practitioners to improve the identification and referral of adults with obesity. (ii) To explore how and why GPs and Practice nurses identify and refer adults with obesity, particularly in the context of weight-related co-morbidity.

Methods: Realist synthesis provides an explanatory analysis aimed at discerning what works, for whom, in what circumstances, how and why (2). A search strategy informed by a previous Cochrane systematic review (3) was developed (Appendix A). Title, abstract and full paper screening were done independently by two reviewers, with disagreements resolved by a third reviewer. Information on context (C), mechanisms (M) and outcomes (O) was extracted using a pre-piloted form.

Results: The PRISMA flow diagram for search results is in Appendix B. Included studies (mostly from the USA and Europe) involved practitioner training, audit/feedback, and various tools/prompts (e.g. BMI calculators). Positive and negative CMO configurations will be presented, showing how they relate to a priori theories operating at the individual, inter-

personal and institutional levels. A refined “programme theory” of these interventions will be described.

Conclusion: Lessons will be drawn with regard to what works, for whom, in what circumstances to improve the identification and referral of adults with obesity in primary care.

References:

- 1 NICE. Obesity: guidance on the prevention, identification, assessment and management of overweight and obesity in adults and children. 2006. London, NICE.
- 2 Pawson R et al. Realist review—a new method of systematic review designed for complex policy interventions. *J Health Serv Res Policy* 2005; 10 Suppl 1:21–34.
- 3 Flodgren G et al. Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in overweight and obese people. *Cochrane Database Syst Rev* 2010;(3):CD000984.

Appendix A: Search strategy

- **Databases searched:** Medline, EMBASE, CINAHL, PsycINFO, Web of Science and Science Direct
- **Search terms:** e.g. for OVID Medline, below
- exp Obesity/ or exp Obesity, Morbid/ OR (obes\$ or overweight\$).tw. OR Weight Loss/ AND
- exp Education, Continuing/ OR (education\$ adj2 (program\$ or intervention\$ or meeting\$ or session\$ or strateg\$ or workshop\$ or visit\$)).tw. OR (behavior\$ adj2 intervention\$).tw. OR *pamphlets/ OR (leaflet\$ or booklet\$ or poster\$ or posters).tw. OR ({written or printed or oral} adj information).tw. OR (information\$ adj2 campaign).tw. OR (education\$ adj1 (method\$ or material\$)).tw. OR outreach.tw. OR ({opinion or education\$ or influential\$ adj1 leader\$).tw. OR facilitator\$.tw. OR Practice Guideline as Topic/ OR *guideline adherence/ OR practice guideline\$.tw. OR (guideline\$ adj2 (introduc\$ or issu\$ or impact\$ or effect\$ or disseminat\$ or distribut\$)).tw. OR (effect\$ or impact\$ or evaluat\$ or introduc\$ or compar\$) adj2 training program\$.tw. OR *reminder systems/ OR reminder\$.tw. OR (recall adj2 system\$).tw. OR (prompter\$ or prompting).tw. OR *feedback/ or feedback.tw. OR chart review\$.tw. OR ((effect\$ or impact\$ or records or chart\$) adj2 audit).tw. OR compliance.tw. OR marketing.tw. AND
- exp "Referral and Consultation"/ OR ((effect\$ or impact\$ or evaluat\$ or introduc\$ or compar\$) adj2 (treatment\$ or care\$ or screen\$ or prevent\$) adj2 program\$).tw. OR ((effect\$ or impact\$ or introduc\$) adj2 (legislation\$ or regulations\$ or policy)).tw. OR *medical records/ OR *medical records systems, computerized/ OR (information\$ adj2 (management\$ or system\$)).tw. OR *utilization review/ OR *Quality Assurance, Health Care/ OR Quality of Health Care/ OR *program evaluation/ OR triage.tw. OR *telephone/ OR (physician patient adj (interaction\$ or relationship\$)).tw. OR ((standard\$ or usual\$ or routine\$ or regular\$ or traditional\$ or conventional\$ or pattern\$) adj2 care).tw. OR (program\$ adj2 (reduc\$ or increas\$ or decreas\$ or chang\$ or improv\$ or modify\$ or monitor\$ or care)).tw. OR ((introduc\$ or impact\$ or effect\$ or implement\$ or computer\$) adj2 protocol\$).tw. OR (computer\$ adj2 (diagnosis\$ or decision\$)).tw.
- **Limits:** year 2004 onwards; English language

Fig. 1. Appendix A: Search Strategy

This shows the databases searched and an example of the search terms used, with limits



Fig. 2. Appendix B: PRISMA Flow diagram

This shows the results of the search strategy

Effects of different enteral feeding methods on gastrointestinal system and hospitalization duration in neurologic patients in pediatric intensive care unit

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Background/Aims: Nutritional status of neurologic patients in pediatric intensive care unit was affected by disease complications and malnutrition could be the major problem if adequate nutrition support was not been provided. The patients' malnutrition increases the cost of treatment by extending the length of hospital stay. Therefore, an accurate nutritional support is important in pediatric neurological patients. The aim the study was determine the effects of different enteral feeding methods on gastrointestinal system complications and hospitalization duration in neurologic patients in pediatric intensive care unit.

Objectives: This study includes patients in intensive care unit with the diagnosis of neurological disease. Group consists of 20 female and 15 males with age of 3–14 months in Dr. Sami Ulus Research and Training Hospital of Women's and Children's Health and Diseases, Ankara, Turkey.

Material/Methods: These 35 patients were grouped with different feeding regimens as with intermittent bolus via nasogastric tube, and continuous infüzyon method, and evaluated for effects on gastrointestinal system and duration of hospitalization. Sample survey was done for biochemical analysis and complications for each group.

Results: Groups were found to be similar in terms of body weight and length according to age ($p > 0,05$). While significant difference was determined between groups on first and fourth day of the study with the values of energy, macronutrients ($p < 0,05$), difference was found to be insignificant on day 7 ($p > 0,05$). The formula and fluid intake was found to be high and faster in continuous infüzyon method ($p < 0,05$). There were no difference in complication rates and day of occurrence between groups ($p > 0,05$). Potassium and sodium levels increased significantly on fourth day when compared to first day in both groups ($p < 0,05$). Calcium, phosphorus and BUN levels were increased significantly in intermittent bolus group ($p < 0,05$) while total bilirubin level was decreased significantly ($p < 0,05$).

Conclusion: As a result we found that, continuous infusion method, but showed no advantage in terms of complication rate and duration of hospitalization.

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IFSO-EC PLENARY SESSIONS

Thursday, 2 June, 2016

PL3 – IFSO–EC Plenary Session: Internal hernias after laparoscopic gastric bypass

PL3.01

Delayed Pain after Gastric Bypass – Do not delay !

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Background and Aims: Between 2009 and 2012 surgeons through the UK undertook an estimated 4000 Roux-en-Y gastric bypasses. Late onset post-operative pain may have various causes, but should not be ignored. The author's advice was sought in the wake of some cases of small intestinal infarction.

How can infarction due to internal hernia be prevented?

Material and Methods: Confidential case note review of 3 unselected patients seeking legal advice. Extracted anonymized data presented with full patient consent.

No fault is alleged.

Comparison was made to other causes of delayed pain.

Results: Age ranged from 35 to 62, pre-operative weight from 114kg to 212kg, BMI at operation from 42kg/m² to 58kg/m². Onset of pain was 6 to 33 months after bypass, with premonitory symptoms occurring at 4 to 32 months. Delay from onset of symptoms to surgery was 48 to 72 hours (45 to 68 hours from admission). Primary hospital stay for this event was 59 to 146 days. All patients lost most of their small bowel and all depend on long-term nutritional support treatment for intestinal failure.

Conclusion: Internal hernia is a rare complication of any Roux-en-Y reconstruction, but it is potentially catastrophic and should be included in pre-operative consent discussion. It is not unique to bariatric surgery and prevention of infarction due to it may not rest on specialist bariatric knowledge so much as on the application of recognised standard emergency surgery principles.

Gastric bypass patients should be provided with standardised safety information – for their own guidance and for that of admitting general hospitals. This information will carry greater weight if IFSO-endorsed.

Disclosure: No conflict of interest declared

PL3.02

Closure or non-closure of mesenteric defects: Results of a PRT

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Background and Aims: Small bowel obstruction due to internal hernia is a common and potentially serious complication after laparoscopic gastric bypass surgery. Whether closure of surgically created mesenteric defects might reduce the incidence is unknown, so we did a large randomised trial to investigate.

Material and Methods: This study was a multicentre, randomised trial with a two-arm, parallel design done at 12 centres for bariatric surgery in Sweden. Patients planned for laparoscopic gastric bypass surgery at any of the participating centres were offered inclusion. During the operation, a concealed envelope was opened and the patient was randomly assigned to either closure of mesenteric defects beneath the jejunojejunostomy and at Petersen's space or non-closure. After surgery, assignment was open label. The main outcomes were reoperation for small bowel obstruction and severe postoperative complications.

Results: Between May 1, 2010, and Nov 14, 2011, 2507 patients were recruited to the study and randomly assigned to closure of the mesenteric defects (n = 1259) or non-closure (n = 1248). 2503 (99.8%) patients had follow-up for severe postoperative complications at day 30 and 2482 (99.0%) patients had follow-up for reoperation due to small bowel obstruction at 25 months. At 3 years after surgery, the cumulative incidence for reoperation because of small bowel obstruction was significantly reduced in the closure group (cumulative probability 0.055 for closure vs 0.102 for non-closure, HR 0.56, 95% CI 0.41–0.76, p = 0.0002). Closure of mesenteric defects increased the risk for severe postoperative complications (54 (4.3%) for closure vs 35 (2.8%) for non-closure, OR 1.55, 95% CI 1.01–2.39, p = 0.044), mainly because of kinking of the jejunojejunostomy.

Conclusion: The results of our study support the routine closure of the mesenteric defects in laparoscopic gastric bypass surgery. However, closure of the mesenteric defects might be associated with increased risk of early small bowel obstruction caused by kinking of the jejunojejunostomy.

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Disclosure: No conflict of interest declared

PL3.03

How to close the mesenteric defects in ante-colic ante-gastric RYGBP (video)

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Sweden

Closure of mesenteric windows has been debated over long time in bariatric surgery. Accumulating evidences support the strategy of closing the. A recent large randomised trial in Sweden demonstrates that there is a substantial decrease in the risk of re-operation due to bowel obstruction over three years in patients having their defects closed. However, this was achievable at a price of an increased number of early re-operations due to kinking of the bowel at the level of the jejunum-jejunosomy.

The video focus on how to close especially the mesenteric defect behind the jejunum-jejunosomy, but also at Petersen's space. My recommendations to avoid kinking at the JJ with the "double loop technique" for Roux-en-Y gastric bypass which is the standard in Scandinavian bariatric surgery are; 1. double stapling of JJ (30mm orally and 30mm aborally) 2. Dividing some 5–7 cm of mesentery between anastomoses before closure enabling the JJ to fall below transverse colon 3. Suturing or clipping of the defect deep in mesentery enabling a floppy JJ

PL3.04

How to close the mesenteric defects in retro-colic RYGBP (video)

[no abstract]

PL3.05

Laparoscopic revision of internal hernia after Roux en Y gastric bypass

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Background and Aims: Internal hernias are a quite common complication in patients after gastric bypass. The symptoms vary from mild post-prandial pain up to massive acute abdominal pain. Because of this wide spread field of symptoms it is hard for the clinician to recognize a internal hernia. Retrospectively up to 97% of internal hernias could be diagnosed through CT. But only 67% are diagnosed preoperatively. The whirl sign seems to be a good predictor for internal hernias in CT scans.

When diagnosed, internal hernias can often be solved laparoscopically. The video presents two cases of female patients who underwent a laparoscopic Roux en Y gastric bypass procedure 12 month respectively 22 months prior to the revision surgery due to internal hernia.

Disclosure: No conflict of interest declared

Friday, 3 June, 2016

PL6 – IFSO–EC Plenary Session: which operation for T2DM

PL6.01

Bypass

[no abstract]

PL6.02

Sleeve

[no abstract]

PL6.03

Sleeve Gastrectomy in the patients with BMI <35

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Background and Aims: For many years bariatric surgery has been indicating in patients with BMI at least > 35. IFSO Statement issued in 2014 accepted an idea to operate carefully selected patients with Class I obesity.

Objectives: The aim of this study is evaluation of results of Sleeve Gastrectomy (SG) in patients with BMI<35 and in some cases- <30.

Material and Methods: 65 patients with preoperative BMI < 35 have undergone SG as a primary operation. 8 of them had BMI 25–29,9 (overweight) ; 3- normal BMI (<25). Many of them had more degree of obesity in the past and referred for surgery during weight regaining after conservative treatment. 4 had Diabetes Mellitus type 2; 6 –features of Bulimia Nervosa (BN) with purging behavior. 3 normal weighted pts asked for surgery mainly not for weight loss but for improving quality of life (QoL) seriously impaired by exhausting diets, physical loads and purging behavior.

Results: Mortality-0, early complication- 1/65 (1,54%) – perigastric abscess. EWL after SG exceed 90% in all follow-up periods since 9 months and 84,7% - at 5 years (5 pts). There were no pts with excessive weight loss and serious undesirable metabolic consequences. Other results: Resolution of DM2 and cessation of bulimic attacks, high satisfaction of pts with their QoL.

Conclusion: SG in experiences hands is acceptable treatment for well-motivated, properly informed carefully selected pts with BMI<35 failed with conservative attempts for weight loss and its maintenance. Special indica-

tions for SG may be DM2 and BN. With these terms SG can be considered as an option for treatment for eating disorders including BN even in normally weighted and overweighted pts with BMI < 30 .

Disclosure: No conflict of interest declared

Saturday, 4 June, 2016

PL8 – IFSO–EC Plenary Session: Plastic Surgery after massive weight loss

PL8.01

Plastic Surgery after massive weight loss

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Objectives: The objectives of this session is to increase knowledge about excessive skin after massive weight loss.

Material and Methods: The presentation will be based on results from following trials:

- Normal values evaluated by 1408 subjects randomly chosen Swedish citizens from 18–59 years of age who filled out the Sahlgrenska Excess Skin Questionnaire (SESQ).
- Development of excess skin after obesity surgery evaluated in 149 patients objectively assessed prior to and 18 months after obesity surgery. Patients also filled out SESQ.
- Experience from excess skin was assessed by SESQ and a questionnaire concerning additional contouring surgery or requests for the same in 484 adults and 47 adolescents.
- In a randomized controlled trial 94 postbariatric patients were evaluated objectively and subjectively before and after abdominoplasty with and without plication of rectus abdominis.

Results: The results of the normal population revealed that a majority of a randomly selected population in Sweden, regardless of sex, does not suffer from excess skin.

After obesity surgery circumference and ptosis measurements decrease except for ptosis on the thighs. There is a low correlation between objective measurements and the patients' subjective response of their experience from excess skin. For every centimetre of ptosis on the abdomen pre-operatively, there is a twofold higher probability of having a postoperative ptosis on the abdomen of > 3 cm.

A majority of post bariatric patients (adults as well as adolescents) experience significant problems of skin excess and request body contouring surgery, with predominance for women. Though there is a great discrepancy between performed and request for surgery.

Abdominoplasty improved physical, functional and psychosocial impairment. For unselected patients undergoing abdominoplasty an adjunct with plication has no additional effect.

Conclusion: Excess skin is no problem within a normal population, but for a majority of postbariatric patients. Abdominoplasty has a positive impact on health and function, but it is not enough. Further surgery seems to be necessary to normalize this population. It is a challenge for plastic surgery to fulfil the requirements for additional contouring surgery.

Disclosure: No conflict of interest declared

Desire for body contouring surgery risk factor for weight regain?

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Background and Aims: Despite the fact that almost all post-bariatric patients desire treatment by Body Contouring Surgery (BCS), only a small part of the population will undergo a procedure. Costs seem to be the main reason for this, since BCS is generally not covered by health insurance and variation in provision is diverse.

Objectives: This nationwide study assesses skin redundancy, BCS and psychological status of a large post-bariatric population, focusing on the differences between patients who have undergone BCS and patients who have not.

Material and Methods: Online questionnaires were completed regarding demographics, BCS, depression (Beck depression Inventory, BDI), self-esteem (Rosenberg Self-esteem Scale, SES), body image (Body Shape Questionnaire, BSQ, & Multidimensional Body-Self Relations Questionnaire) and quality of life (RAND-36). Patients were divided in three groups: BCS-group: patients who had BCS; ND-group: patients who do not desire BCS and D-group: patients who desire BCS.

Results: A total of 600 patients signed informed consent and were included. Mean age was 47 years, 80.8% was female. Follow-up between BS and inclusion was 32 months.

BCS-group consisted of 11% of the population (n = 65), D-group 69.1% (n = 363) and ND-group 30.0% (n = 157). Mean BMI was 27.6 kg/m² in D-group versus 31.0 kg/m² in ND-group (p < 0.001) and 31.3 kg/m² in the ND-group (p < 0.001). D-group scored highest on BSQ 49.6 versus 30.1 in ND-group (p < 0.001) and 40.2 in BCS-group (p < 0.001). And lowest on appearance evaluation: 2.58 versus 3.26 (ND-group; p < 0.001) and 3.23 (BCS-group; p < 0.001).

Of the patients who desired BCS 26.1% (n = 95) did not get provision from health insurance. Additionally 39.8% (n = 145) never consulted a plastic surgeon.

Conclusion: Patients who desire BCS have a negative body image, which is known to cause weight gain in obese patients. A significant part of the patients who desire BCS seem to have an indication for BCS. More effort should be made to guide patients in the process of consulting a plastic surgeon for BCS, by combining treatment with the bariatric team.

Disclosure: No conflict of interest declared

IFSO-EC REVIEW/WORKSHOP SESSIONS

Thursday, 2 June, 2016

RS9: IFSO-EC Session – Young IFSO Session: Long-term side effects of bariatric surgery

RS9.01

Motivations for seeking bariatric surgery – the importance of health professionals and social networks

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Background and Aims: The reasons for seeking bariatric surgery are incompletely understood. This information is needed to inform health-service planning and therapeutic decisions.

Objectives: To examine Australian patients' motivations for seeking bariatric surgery.

Material and Methods: Ten focus groups were audio-recorded, transcribed verbatim and analysed thematically.

Results: Thirty-two women and 17 men (mean age 55 years; range 23–72) who had received or were wait-listed for publicly- or privately-funded bariatric surgery engaged in the study. Novel findings highlighted the importance of other bariatric surgery recipients, health professionals' recommendations (e.g. bariatric surgeons, medical specialists and general practitioners), the media (e.g. television shows on bariatric surgery) and having private health insurance. We also confirmed previous findings that people seek surgery for physiological and psychological health, and because of previous failed weight loss attempts and significant others (e.g. wanting to live longer for children).

Conclusion: Many individual, societal and environmental factors influence people to seek bariatric surgery. Exposure to recipients of bariatric surgery and recommendations made by health professionals appear to be common factors prompting a surgical pathway not previously reported. Factors motivating people to have surgery can inform therapeutic decisions and could be used to optimise follow-up and adherence to care. Bariatric surgery uptake may spread in social networks, which has growing implications for health service planning as more people seek this pathway.

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RS9.02

Risk factors for complications after bariatric surgery

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Background and Aims: Due to obesity epidemic, bariatric procedure number is continuously increasing, including laparoscopic sleeve gastrectomy (LSG) or laparoscopic gastric by-pass (LGB). We aim to assess complications and their risk factors in 2nd Department of General Surgery Jagiellonian University Medical College patients, basing on our six-year experience. **Objectives:** Assessment of bariatric procedures complication rates. Evaluation of complication risk factors.

Material and Methods: Data of 408 patients, operated on morbid obesity in the 2nd Department of General Surgery JUMC since 2009 till 2015, were collected retrospectively. Patients were qualified to LSG or LGB by multidisciplinary team. Patients were divided into two groups: with and without complications in 30-days perioperative period. Analysis were conducted using Statistica 10.0 PL. Pearson's test and chi-square with corrections assessed qualitative data. T-student, Mann-Whitney's tests analyzed quantitative data. Logistic regression analysis were performed. Statistical significance was observed with $p < 0.05$.

Results: Complication, mortality and reoperation rates were respectively 7.35%, 0.49%, 1.23%. Most frequent complication was rhabdomyolysis (2.2%). 2 deaths in LGB occurred due to pulmonary embolism and peritonitis with strangulated incision hernia and anastomosis dehiscence. According to univariate logistic regression maximal weight, maximal BMI, weight on the day of procedure and BMI on the day of procedure in LGB increased OR of complications ($p = 0.011$; 0.017; 0.010; 0.009), which stayed significant in multivariate logistic regression. In LSG univariate logistic regression showed statistically significant OR in maximal weight, maximal BMI, weight on the day of procedure and BMI on the day of procedure ($p = 0.019$; 0.017; 0.021; 0.021), as well as procedure duration (OR: 1.02; 95%CI: 1.01–1.03; $p < 0.001$) and number of staplers (OR: 2.40; 95%CI: 1.44–3.99; $p < 0.001$). However multivariate logistic regression revealed significance of only the last two parameters. Out of 12 co-morbidities none affected significantly OR of complications. Type of procedure, intraoperative adverse effects and surgical experience of operator did not affect OR of complications ($p = 0.741$; 0.961; 0.119).

Conclusion: LSG and LGB are relatively safe procedures, even performed by surgeon on the learning curve. BMI is the most reliable risk factor for LGB complication. In LSG number of used staples and procedure duration increase complications risk.

Acknowledgement: This research was supported by Faculty of Medicine, Jagiellonian University Medical College, Leading National Research Centre (KNOW) 2012–2017.

Disclosure: No conflict of interest declared

RS9.03

Mesenteric defect closure After Laparoscopic Roux-en-Y Gastric Bypass

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Objectives: The internal hernia is a rare but potentially fatal complication of Laparoscopic Roux-En-Y Gastric Bypass (LRYGB). The aim of this study is to determine the impact of mesenteric defect closure on the incidence of internal hernia after (LRYGB).

Material and Methods: A retrospective study 1861 (LRYGB) has been done in Bariatric Surgery Center at CHU Nice, France, between January 1998 and December 2013. Until December 2004, 312 patients were operated without closing of mesenteric defect (Group A). From January 2005 until December 2013, 1549 patients were operated with closing mesenteric defects at the Petersen's Defect (PD) and the level of jejunum-jejunal

anastomosis (JJA), by non-absorbable suture (Group B). The incidence of internal Hernia was compared between two periods.

Results: 7 patients in (Group A) Had Internal Hernia 2.24% (all at JJA) vs. 13 in (Group B) 0.84% (6 at JJA, 5 at the PD and 2 at both of them). The median interval between (LRYGB) and reoperation is 53 months in group A and 26 months in group B. The median percentage of excess weight loss (%EWL) is 61% vs 67%, respectively. 14 patients 70% (5 in group A) were admitted in emergency with an acute abdomen pain. A CT was performed in 8 patients 40% and has shown signs of occlusion in all cases. The most common symptoms were abdominal pain and vomiting. The surgery was performed by laparoscopy in 8 patients 40% and by laparotomy or conversion in 12 patients 60%. In all cases internal hernia was reduced and closed the defects. In only one patient in (group A) small bowel at JJA was resected. There was no mortality and one patient had pneumonia with acute respiratory distress which was treated medically.

Conclusion: The closure of mesenteric defects at (LRYGB) by tight non-absorbable sutures is recommending because it is associated with a significant reduction in the incidence of internal hernia.

Disclosure: No conflict of interest declared

RS9.04

Changing levels of pth after scopinaro biliopancreatic bypass surgery

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Background and Aims: Metabolic effects of biliopancreatic bypass have been described in the literature. It's know that the Scopinaro technique is associated with secondary hyperparathyroidism and serum parathyroid hormone (PTH) levels. The aim of this paper is to evaluate the effects of the surgery on PTH levels in preoperative time and after surgery.

Objectives: Relationship between PTH and morbid obesity surgery technique according to Scopinaro biliopancreatic bypass Scopinaro

Material and Methods: Three hundred obese patients, 20% men and 80% women aged 19–65 years. Median BMI in females was 49.65 (42–70) and in men was 53.65 (46–76). The patients were studied pre-surgery and 6, 12, 24 and 36 months after Scopinaro surgery. The PTHi levels were measured by chemiluminescence in an Immulite 2000. The comparison between PTHi pre-surgery and at the different times after surgery was studied with Wilcoxon test. Pearson correlation linear regression was used to evaluate association between PTH and IMC.

Results: Preoperative 218 obese patients (72.9%) presented normal PTH levels and 82 (27.08%) basal secondary hyperparathyroidism. From 218 with initial normal PTH, 71 (32.8%) developed post-surgery hyperparathyroidism. No significant correlation between basal serum PTH a 6 months was found. But yes at 12 ($p < 0.007$), 24 and 36 months. PTH pre-surgery was not correlated with BMI.

Conclusion: The secondary hyperparathyroidism is present in a big percentage of patient's with morbid obesity. The difference between PTH at different times post surgery is significant with the basal at one and two years but not in the early postoperative periods. PTH pre-surgery was not correlated with BMI.

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Acknowledgement: Special thanks to the multidisciplinary team that deals with morbid obesity

Disclosure: No conflict of interest declared

RS9.05

A single center review of reversal and conversion from Roux-en-Y gastric bypass to Normal anatomy and sleeve gastrectomy

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Background and Aims: The growing number of bariatric procedures is quite logically accompanied by a number of failures, some of which may require surgical treatment such as reversal or conversion to another bariatric procedure.

For instance, some mid-term results suggest that possible malabsorptive complications can appear after laparoscopic Roux-en-Y gastric bypass (RYGB). Thus, a conversion to a less malabsorptive procedure is required or even reversal.

Objectives: This study was designed to describe and analyse the outcomes after laparoscopic reversal to normal anatomy (NA) with concomitant sleeve gastrectomy (SG), after Roux-en-Y gastric bypass (RYGB). Reversal has been proposed as corrective strategy after RYGB.

Material and Methods: We propose a retrospective analysis of a prospectively kept database.

Results: From 2011 to 2014, 5 female patients underwent laparoscopic reversal including SG after RYGB for presenting with severe hypoglycaemic syndrome. Preoperative BMI was 31.162 (28–39.38) kg/m². Postoperative complications (CT diagnosed colitis and intraabdominal collection) only appeared in one case (20%) and were treated conservatively, without needing further surgical treatment. Mean hospital stay was 9.8 days. Mortality was 0. All patients recovered from their initial condition, but some of them (2/5; 40%) presented with mild hypoglycaemias during follow-up. Two of them experienced weight regain (40%). One patient developed gastroesophageal reflux disease (GERD) (20%). Two of them showed signs of psychological troubles (functional stenosis, anorexia) (40%). Mean BMI in the last follow-up was 29.768 (20.31–38.39).

Conclusion: Outcomes of laparoscopic reversal including SG after RYGB are good, showing clinical improvement of hypoglycaemic syndrome in all cases. This technique seems to be feasible and without severe long-term complications. Further investigations are warranted to confirm our preliminary results.

Disclosure: No conflict of interest declared

RS9.06

Taste Sensory Changes in Morbidly Obese Patients Who Are Applied Laparoscopic Adjustable Gastric Band

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Background and Aims: In this study, in the patients undergoing laparoscopic adjustable gastric band (LAGB), changes in sense of taste and effectiveness in weight loss were investigated.

Objectives: In this study, in the patients undergoing laparoscopic adjustable gastric band (LAGB), changes in sense of taste and effectiveness in weight loss were investigated.

Material and Methods: Between June 2006 and January 2012, 115 morbidly obese patients underwent LAGB enrolled in prospective clinical trials. Anthropometric measurements of the patients were performed. Excessive body weight loss (EWL%) was calculated. Preoperative measurements were compared with postoperative six months, first and third years. When Friedman test applied to changes over time, $p < 0.05$ was

considered significant. In order to measure changes in the taste sensory, 23-item questionnaire of the University of Tennessee, College of Medicine was administered.

Results: Age of the patients was 36 ± 9 years. Body mass index 47.35 ± 8.34 kg/m², EWL% was 28.53 ± 9.39 at 1 year, 36.06 ± 13.22 at 3 years ($P = 0.000$). Periods showed differences between the anthropometric measurements ($P < 0.05$).

Patients with postoperative 6 months, 1 and 3 years, reported that they felt the taste of sweet foods increase as 63.0%, 58.3%, 34.5% respectively ($P = 0.030$). Those who feel changes in the taste of food and beverages (91.4%), was 89.57 ± 20.04 kg, those who hadn't was 102.62 ± 16.77 kg ($P = 0.005$, $P = 0.043$). According to the period decreased sense of taste intensity in 91.1, 89.5 and 81.8% respectively ($P = 1.000$). Yet in the same period, 50.5, 46.9, and 36.4% were determined from certain foods or they can not tolerate their disgust ($P = 0.056$). In the postoperative period, 87.0, 84.4, 89.1% respectively, of the decrease in sense of taste was found to provide a more effective weight loss ($P = 0.257$). In similar studies, weight loss was revealed by the disgust of food, taste-flavor changes (1,2). There is also another study showing those loathed and disgust food lost more weight than who didn't (3).

Conclusion: The changes in sense of taste and reluctance to food, after LAGB, was found to play an important role in achieving significant weight loss. The importance of ensuring that these changes in taste sensation of weight loss will be better understood with new studies.

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Disclosure: No conflict of interest declared

RS9.07

Desire for core tastes decreases rapidly following laparoscopic sleeve gastrectomy. A single-center longitudinal observational study with 6 months follow-up

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Background and Aims: The metabolic effect of laparoscopic sleeve gastrectomy (LSG) results from the modification of gastrointestinal substances that control hunger and satiation via the brain-gut axis. A potential mechanism implicated in weight loss is the shift in food preferences. Our aim was to assess changes in taste preferences, as well as their relationship to weight loss.

Material and Methods: Prospective longitudinal observational study in 100 consecutive LSG patients in our tertiary referral center between 12/2014 and 04/2015. Patients with history of bariatric surgery were not included. A questionnaire with photographs representative of core tastes was administered the day before surgery, day of discharge (D6) and six months post-operatively (M6). Participants were asked to rate each item in terms of desire to consume on a 5 grade Likert scale. Statistical analysis: repeated measures ANOVA and unpaired t-test.

Results: Pre-operative demographics: 77 women/23 men, mean age 40.8 ± 12 years, mean BMI 42.46 ± 6.7 kg/m². Excess BMI loss (EBMIL) at M6: $63.5 \pm 21\%$. Preferences for bitter, salty, umami, fatty, sour, spicy and sweet decreased significantly from baseline to M6, with umami, fatty, sour, spicy and sweet decreasing significantly already at D6. Preferences

of water (4.22) and red wine (1.8) did not change significantly at any time point, cigarettes (1.86) decreased significantly at D6, but came back to the baseline range at M6. The highest changes of preferences at 6 months were for sweet ($\Delta = 1.64$) and fatty ($\Delta = 1.66$). Food aversion (Likert < 3) or taste preference change ($\Delta > 2$) did not correlate with EBMIL at M6. The follow-up rate was 89% at D6 and 82% at M6.

Conclusion: LSG induces a decrease in preferences of all core tastes in the first half-year, with most changes already present 6 days post-operatively. Preferences for sweet and fatty food undergo the highest decline, whereas water, red wine and cigarette preferences remain unchanged. The change in preferences or dysgusia does not seem to influence 6 month EBMIL. Further studies are necessary to assess the long-term impact of taste changes on weight loss after LSG.

Disclosure: No conflict of interest declared

RS10: IFSO–EC Session – Complications

RS10.01

Roux-En-Y Fistulo-Jejunostomy As a Salvage Procedure In Patients With Post-Sleeve Gastrectomy Fistula Mid term results

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Background and Aims: Sleeve Gastrectomy is currently the most common bariatric procedure in France. It achieves both adequate excess weight loss and significant reduction of comorbidities. However, leak is still the most common complication after sleeve gastrectomy. Its risk of occurrence is, albeit, $< 3\%$ in specialized centers. Its management is difficult, long, and challenging. Although commonly endoscopic and nonoperative, the management of post sleeve fistulas could sometimes be surgical including peritoneal lavage, absces drainage, suturing of disrupted staple line, resleeve, gastric bypass, or total gastrectomy. Roux-en-Y fistulojejunosomy (RYFJ) has been described as a salvage option, with only scarce case reports published. We have already reported the early results of RYFJ for post sleeve gastrectomy fistula.

Objectives: In this study, we analyzed the mid-term results of the procedure emphasizing endoscopic, radiologic, and metabolic outcome.

Material and Methods: Between January 2007 and December 2013, we treated 75 patients with post sleeve gastrectomy fistula. Prior to surgery, intraabdominal or thoracic abscesses or collections were either ruled out or treated by computerized tomography scan guided drainage or even surgery. Then, endoscopic stenting was attempted. After optimisation of the nutritional status et in case of failure of endoscopic measures, some of the patients had RYFJ. The procedure was found to be safe and feasible with 0% mortality and 100% leak control.

Mid-term results were assessed using clinical evaluation, metabolic biological analysis, upper digestive tract endoscopy (with pH metry and manometry), CT scan with upper series, and gastric scintigraphy.

Results: Between January 2007 and December 2013, 30 patients (22 women and 8 men) had RYFJ for post SG fistula. Mean age was 47 years (range, 22–59). Procedures were performed laparoscopically in all but 3 cases. 3 patients were lost to follow-up. Mean follow up period was 22 months (18–90).

Mean BMI was 27.4 kg/m² (22–41). All anastomoses were patent. A detailed panel of the endoscopic findings is discussed. No significant abnormality was found on manometry. Emptying scintigraphy showed various panels with dual upper digestive pathway. Morphological assessment of the stomach and the bowel loop is performed.

Conclusion: Roux en Y Fistulojejunosomy is a safe and feasible salvage procedure for patients with post sleeve gastrectomy fistula. Mid-term outcome analysis confirms that fistula control is durable. Weight loss panel is satisfactory. No metabolic disturbances were found.

Disclosure: No conflict of interest declared

RS10.02

Percutaneous gastrostomy is an effective treatment for some chronic conditions following obesity surgery

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Background and Aims: Severe protein malnutrition can occur after bariatric surgery, especially following malabsorptive procedures. Treatment is of utmost importance in order to prevent the development of serious complications, i.e. liver failure. In cases where nutritional guidance is not sufficient, the use of percutaneous gastrostomy (PG) for a period of time can be a valuable helping tool. PG can also be of help in some other chronic conditions after obesity surgery.

Material and Methods: Out of 5539 patients operated for severe obesity in our department from 2005–2015, 23 patients were treated with PG due to chronic complications. The primary operation was biliopancreatic diversion (n = 9), standard gastric bypass (n = 9), 2 m BP-limb gastric bypass (n = 4) or sleeve gastrectomy (n = 1). Registration and follow-up was done in a prospective database.

Results: Indications for gastrostomy were one or more of the following: Hypoalbuminemia (65%), severe diarrhoea (48%), extreme weight loss (39%), persistent abdominal pain (30%), chronic nausea (13%) and persistent hypoglycaemia (9%). PG was inserted 17.5 months (5–67) after bariatric surgery, and treatment duration was 5.3 months (1–15). In patients presenting with hypoalbuminemia (albumin < 36 g/L) (n = 15), albumin increased from 23.8 g/L (18–35) to 35.2 g/L (27–42) during treatment. We also observed positive results on weight, nausea, abdominal pain and hypoglycaemia. In nine patients symptoms disappeared after treatment, and they no longer needed nutritional support. Five patients are still receiving treatment/observation and nine patients had persisting malabsorption and needed new surgery with elongation of the common limb.

Conclusion: PG is a valuable helping tool in order to reverse severe protein malnutrition after obesity surgery and can also be of help in some other chronic postoperative conditions. In patients suffering from persistent malnutrition due to diarrhoea after malabsorptive procedures, PG can help correct hypoalbuminemia before re-operation is performed.

Disclosure: No conflict of interest declared

RS10.03

Revisional surgery to the JJ to alleviate symptoms from kinking at the JJ post LGBP – a cohort study from Sahlgrenska University Hospital

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Background and Aims: Laparoscopic gastric bypass surgery with the Gothenburg Roux-en-Y method (LGBP) has been the gold standard in Scandinavian bariatric surgery over the last decade. In the recent years we have noticed an increase in patients presenting with abdominal pain, sometimes together with postprandial reactive hypoglycemia, nausea and occasionally vomiting.

Objectives: To analyze the outcomes of the patients who underwent revisional surgery to the jejuno-jejunostomy (JJ).

Material and Methods: Through the hospitals surgical coding system we retrospectively identified 73 patients having a previous LGBP and who had undergone revisional surgery aimed at solving problems with the JJ over a 3,5 year period. Medical history was compiled from medical records and patients were interviewed by telephone, following a standardized questionnaire.

Results: The primary LGBP were carried out 2003–2014, at more than 10 different centers. At primary surgery patients had a mean BMI of 42,8 kg/

m², a mean age of 36 yrs and 8% were men (a significantly lower proportion as compared to national mean for primary surgery). Fifty-six percent of patients had a diagnosis of depression or anxiety prior to LGBP. In comparison, the prevalence of psychiatric disorders among bariatric patients registered in SOReg year 2014 was 15%. Thirty-five percent had closure of mesenteric defects at primary LGBP and 36% had a complication within 30 days after surgery (leak (n = 2), kinking of JJ (n = 9)).

After a mean follow up of 11,9 months after revisional surgery 31% were entirely free of abdominal pain and postprandial symptoms. Another 35% reported improvement, 24% reported no change, and 10% reported deterioration since having surgery. There was no significant correlation between operating method at revision and patient outcome.

Conclusion: Revisional surgery to the JJ can alleviate or cure postprandial symptoms and abdominal pain in patients with kinking at the JJ post LGBP. More studies, including prospective approaches are needed to identify patients who will benefit from surgery and what type of revision leads to the best outcome.

Disclosure: No conflict of interest declared

RS10.04

Internal hernia after laparoscopic gastric bypass: Effect of closure of the Petersen's space

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Background and Aims: Bowel obstruction due to internal hernia (IH) is a well known late complication of a laparoscopic roux-en-y gastric bypass (LRYGBP). The objective of this study is to evaluate if closure of the mesenteric defect and Petersen's space will decrease the rate of internal hernias compared to only closure of the mesenteric defect.

Material and Methods: A single center retrospective descriptive study was performed. All patients with LRYGBP from 2011 till 2015 were included. An antecolic technique was used with closure of the mesenteric defect with a non absorbable running suture between 2011 and October 2013 (group 1), and from October 2013 a systematic additional closure of the Petersen defect is performed (group 2). The follow-up time is from 26 till 60 months.

Results: From a total of 2614 patients, 101 patients (3.86%) had an exploratory laparoscopy due to suspicion of bowel obstruction, but in only 54 (2.06%) patients an internal hernia was found. In 3 patients a recurrent IH was noticed at the Petersen's space. The mean age in the population was 41 years and the mean BMI 41 kg/m² at time of the LGBP. Most patients were female (83%).

In the first group, including 1586 patients, 47 (2.96%) were diagnosed with an internal hernia; 34 at Petersen's space and 13 at the mesenteric defect. The mean time interval was 21.6 months and the mean BMI 25.7 kg/m². After closure of the Petersen defect in 1028 patients, an internal hernia during laparoscopy was found in 7 (0.68%) patients after a mean period of 9.6 months; 6 at Petersen's space and 1 at the mesenteric defect.

Conclusion: The results of the present retrospective study are subject to limitation of the difference in mean follow-up time, needed for statistical analysis. After descriptive analysis these results can already provide strong recommendation of closure of the mesenteric defect and Petersen's space, as we notice a tendency to lower incidence of internal hernias.

Disclosure: No conflict of interest declared

RS10.05

Prediction model for hemorrhagic complications after Laparoscopic Sleeve Gastrectomy

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Background and Aims: At present Laparoscopic Sleeve Gastrectomy (LSG) is the most frequently performed bariatric procedure in Europe. Bleeding after surgery is one of the most common complications and requires surgical revision. The incidence of bleeding is high and ranges from 5% to 15%. However, the issue is neglected in literature. Estimating the risk of hemorrhagic (HC) complications after LSG may improve surgical decision-making.

Objectives: The objective of our study is to develop a prediction model for hemorrhagic complications after LSG.

Material and Methods: The retrospective analysis of 522 patients after primary LSG was performed. Patients underwent surgery between January 2013 and February 2015. The primary outcome was defined as a surgical revision due hemorrhagic complications. HC included bleeding and the presence of large hematomas. Multiple regression analysis was performed using SAS University Edition.

Results: The rate of hemorrhagic complications was 4%. The mean age of patients was 41.0 (± 11.6) years and mean BMI was 47.3 (± 7.3) kg/m². On 12 examine variables, 4 variables were associated with risk of HC. Protective factors for HC were: no history of obstructive sleep apnea (odds ratio [OR] 0.22; 95% CI 0.05–0.94) and no history of hypertension (odds ratio [OR] 0.38; 95% CI 0.14–1.05). The low surgeon's experience (odds ratio [OR] 2.85; 95% CI 1.08–7.53) and no staple line reinforcement (odds ratio [OR] 2.85; 95% CI 1.08–7.53) were associated with higher risk of HC.

Conclusion: The results revealed the association between hemorrhagic complications and following factors: obstructive sleep apnea, hypertension, surgeon's experience and reinforcement of the staple line. The risk assessment model for hemorrhagic complications after LSG can contribute to surgical decision-making.

Disclosure: No conflict of interest declared

RS10.06

Short-term outcomes of laparoscopic sleeve gastrectomy on gastroesophageal reflux disease: Does the bougie size matter?

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Background and Aims: Laparoscopic sleeve gastrectomy (LSG) has increased in popularity over the last years as a definitive bariatric procedure. Gastroesophageal reflux disease (GERD) is highly prevalent in morbidly obese patients. The effect of LSG on GERD remains unclear. The aim of this study was to determinate if the bougie size used to perform the LSG is related to postoperative GERD.

Material and Methods: Single-center study involving 22 consecutive patients with BMI >40 kg/m² or >35 kg/m² and medical comorbidities that underwent LSG. Patients were prospectively randomized into 2 groups according to the bougie size (Group 1: 33Fr vs Group 2: 42Fr). An esophageal manometry was performed preoperatively for evaluating the inferior esophageal sphincter (IES) function. A pH-metric study (percent of time with pH<4 in the distal channel) was also acquired preoperatively, 2 months and 1 year after surgery.

Results: Mean preoperative IES pressure was 23,25 mmHg in Group 1 and 19,06 mmHg in Group 2, with no difference between both (p = 0,13). The basal pH-metric study also showed a percent of time with pH<4 of 7,29% in Group 1 and 8,3% in Group 2, with no statistical difference (p = 0,70).

At 2 months after surgery the mean percent of time with pH<4 was 24.8% in Group 1 and 8,85% in Group 2, obtaining a statistically significance between groups at 2 months after LSG (p = 0,036). At one year after surgery the mean percent of time with pH<4 was 11.36% in Group 1 and 19.43% in Group 2.

Conclusion: Our preliminary results suggest that using smaller bougies (33Fr vs 42Fr) increase postoperative gastroesophageal reflux in early postoperative, but it seems to equalize results with patients with larger bougies one year after surgery. This trend at one year after LSG needs of a larger sample size to validate our initial results.

Disclosure: No conflict of interest declared

RS10.07

Conversion from sleeve gastrectomy to Roux-en-Y gastric bypass at our institution. Indications and first-year postoperative outcome

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Background and Aims: Sleeve gastrectomy-(SG) was introduced as first step intervention in a two-step approach in high-risk or super-obese patients^{1,2}. Despite good success rates, SG may inevitably fail, as defined by insufficient weight loss-(IWL), weight regain, surgical complication and poor control of gastroesophageal reflux disease-(GERD)³. IWL and intractable severe GERD can necessitate further surgical intervention¹.

Objectives: The objective of this study was to review our experience with bariatric patients undergoing laparoscopic conversions from SG to Roux-en-Y gastric bypass-(RYGB).

Material and Methods: From October 2005 to September 2015, 124 patients underwent SG at the Bariatric Surgery Unit of "La Paz" University Hospital of Madrid. Of these patients, a total of 26 patients (21%) were converted laparoscopically to RYGB.

Results: There were 16 female and 10 male patients, with a mean age of 44,5 (22–61) years. Before conversion, mean BMI was 46,15 (28–66) Kg/m². The indications for conversion were IWL (84%), GERD (8%), poor tolerance to the SG (4%) and IWL with GERD (4%).

The mean interval from SG to conversion was 45 (23–85) months.

The 100% of the patients underwent laparoscopic RYGB procedures. The rate of complications was 19%. There was no in-hospital mortality. The mean postoperative hospital stay was 8,42 (4–32) days.

The mean BMI after conversion-(ac), %EBMILac, %EWLac were 41,14 Kg/m², 26,07% and 22,33% at one month; 37,45 Kg/m², 43,96% and 38,95% at 12 months, respectively.

Conclusion: Revisional bariatric surgery is a complex and technically demanding surgery and is generally associated with a considerable higher risk than that of primary procedures.

Conversion to RYGB is a treatment for IWL or severe intractable GERD following SG.

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Disclosure: No conflict of interest declared

RS10.08

Laparoscopic proximal banding after failed gastric bypass, and sleeve gastrectomy; a historical cohort study

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Background and Aims: Long term follow up after gastric bypass and sleeve gastrectomy can reach 40% failure rate. It is mostly explained by their loss restrictive components. We describe our clinical experience performing proximal adjustable banding to the weight regained gastric bypass and the sleeve patients.

Material and Methods: We followed 48, and 33 patients who had proximal adjustable banding after failed gastric bypass and sleeve gastrectomy respectively. Their mean original BMI was 43 ± 7 and all patients were followed for a mean of 54 ± 13 months. This group (81 patients) was compared to randomly chosen corresponding group after original banding with the same gender, follow up time, and original BMI.

Results: There was no significant difference in postoperative weight loss between the redo and originally banded group ($p = 0.278$). The redo group has lost 12.647 of BMI units of BMI (from 43 ± 48 to 30.84 BMI) while the Control group after original banding has lost 10.274 units (BMI from 42.9 ± 6.9 to 32.7 ± 7.4). there was significant difference between the groups with regard to operation length and hospital stay. Operation length was 65 ± 25 and 20 ± 13 minutes in the reoperation and original banding groups respectively. Postoperative hospital stay in the reoperation group was 22.8 ± 18 hours, and 14.8 ± 15 in the original banding ($p = 0.002$). Despite the significant difference in operation time and hospital stay there were no difference with regard to major complications between the compared groups.

Conclusion: We found the proximal gastric banding is a long term efficient bariatric restrictive solution after the gastric bypass and sleeve failures. furthermore, it is a safe operation as a second bariatric surgery.

Disclosure: No conflict of interest declared

RS12: IFSO-EC Session – Value of registries

RS12.01

SOReg – The Scandinavian Obesity Surgery Registry

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Background and Aims: The aim of the registry is to improve results and quality of bariatric surgery (BS) and to be an instrument for research and new knowledge.

SOReg is tightly tied to the BS-profession. The steering committee is appointed by the Swedish Association for Upper Abdominal Surgery including representatives for the networks of bariatric dieticians and nurses. The registry is run by a director and a full-time nurse is working with validation of the database.

In the building of SOReg great effort was put upon user-friendliness. Definitions must be easily understood by the patient, nurse and surgeon on the floor. Logic functions for impossible, and warnings for unusual, values are used. Norway has been involved in SOReg for many years but different legal question has postponed their participation until 2015, now fully participating.

Validity of data is fundamental and SOReg is at intervals cross-run with other registries e.g. the national registry of death. Departments are regularly visited and their routines are monitored, values in the registry are compared with the randomly selected patients' records.

Data are collected preoperatively, during the operation, at 6 weeks for days 0–30, at 1, 2, and 5 years. The registry started May 2007 and were fully running from 2010 with > 98.5% of all procedures covered and 100% of all

departments in Sweden involved. The registry contains more than 50 000 patients and has the largest database of BS-quality-of-life measurements in the world.

Results: and analyses of quality are reported regularly fully transparent in detail for each department (www.ucr.uu.se/soreg). All departments can on-line at any time get their own data for local analyses.

SOReg has been involved in several research project published in high-impact journals. One large register based RCT ($n = 2507$) regarding closing of mesenteric defects in laparoscopic gastric bypass has been published and another R-RCT comparing sleeve-gastrectomy with gastric bypass planned for $n = 4000$ has recently started.

Disclosure: No conflict of interest declared

RS12.02

Sleeve gastrectomy vs Roux-en-Y gastric bypass. Analysis of data from the IFSO-European Chapter Center of Excellence program.

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Background and Aims: Sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGBP) are the most commonly used operations to treat morbid obesity worldwide.

Objectives: To compare SG vs RYGBP performed in Institutions from 24 Countries, participating in IFSO-EC Centers of Excellence (COE) program.

Material and Methods: Since the initiation of IFSO-EC COE program in January 2010, 33,062 bariatric procedures have been entered prospectively by 130 participating surgeons in the International Bariatric Registry (IBAR) up until December 31st 2015. From them, 6,413 SG and 10,622 RYGBP performed as primary procedures with at least 12 months follow-up were retrospectively compared.

Results: There were steadily increasing numbers of patients underwent SG from 2010 to 2015. The overall intra-operative complications rate for SG group was 1,20% whereas for GBP group was 1,04% -NS. The overall early (<30 days) post-operative complication rate for SG was 2,12% and significantly higher 3,02% ($p < 0.001$) for RYGBP. Only 2 patients, one in each group died in the first 30 post-operative days. (0,016% mortality for SG vs 0,009% for RYGBP – NS). From SG group 103 patients-1,61% and 206 patients-1,94% from RYGBP group required re-admission following hospital discharge in the first 30 days following bariatric surgery-NS. From the SG group 78 patients (75,8%) were re-operated vs 104 patients (50,5%) from the GBP group ($p < 0.0001$). Patients with SG were heavier pre-operatively. However, significantly greater weight-loss was observed following GBP in all post-operative years (73.8% vs 68%, $p < 0.001$).

Conclusion: Both procedures were performed with very low complications, mortality, re-admissions and re-operations rate in Institutions participating in IFSO-EC COE program. Greater weight-loss was observed following RYGBP, the first 5 post-operative years.

Disclosure: No conflict of interest declared

RS12.03

Postoperative complications within 30 days at an academic teaching hospital – analysis of 2000 cases

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Background and Aims: Low complication rates of bariatric surgery are a prerequisite to convince payers and insurance providers to pay for the operation. Therefore and for one's own control the continuous analysis and presentation of complications are mandatory.

Material and Methods: We retrospectively studied the prospective collected data of our bariatric patients operated from 2012 to 2014. Two groups were studied: postoperative in-hospital complications before discharge and readmission after discharge within 30 days. Complications were grouped in surgical and medical ones as well as for primary (PP) or revisional procedures (RP).

Results: 2171 patients were operated on. Roux-en-Y gastric bypass accounted to 90% 1963 persons received a primary procedure, 208 patients underwent a revisional one. In-hospital surgical complications were 3.3% (PP 1.9%; RP 7.3%) and medical complications were 1.9% (PP 0.9%; RP 0.5%). Readmission within 30 days happened in 1.1% (25/2171) due to surgical problems in 0.9% (PP 0.9%; RP 0.5%) and medical ones in 0.3% (PP 0.17%; RP 0.5%). Surgical complications decreased from 2.8% in 2012 to 1.3% in 2014 for primaries. Less than half of the surgical complications were major ones. No mortality occurred in the study period.

Conclusion: Continuous documentation of complications helps to improve the results of the department and allows to answer questions of the payers concerning the quality of surgery of the institution. Surgical complications of about 2% in primary operations are comparable to other laparoscopic procedures (cholecystectomy, fundoplication ...) in lean patients although patients suffer from more comorbidities.

Disclosure: No conflict of interest declared

RS12.04

What happened to gastric band patients during follow up of 14 years

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Background and Aims: Laparoscopic gastric banding procedure (LAGB) is decreasing worldwide in favour of other bariatric procedures . Common reason is the dissatisfaction of the patients or the late complications.

Objectives: We observed prospectively what happened to 1800 gastric band patients after long time follow up (FU).

Material and Methods: Between 2001–2015. we have performed 1800 LAGB-operations. 1460 patients (77%) were available for follow up. We collected our data prospectively. Recorded data preoperatively included age, sex, comorbidity, body mass index (BMI), Postoperatively recorded data included, intra and post operative morbidity and mortality, percentage of excess weight loss (%EWL), at 3,6 and 12-months and then annually up to 14 years postoperatively, as well Removal or conversion rate of the gastric bands.

Results: 420 patients had follow up 10 years or more (29%), of these 36% of them had their band removed or converted to other bariatric procedure. 640 patients had follow up between 5 and 10 years, 26% of them had their band removed, or converted to other procedure. 400 patients with follow up less than 5 years, 11% had their band removed or converted.

Mean BMI decreased mostly with more satisfaction in the first 5 years postop. Only 48% of the patient achieved excess weight loss >50% with FU 10 years or more.

Reasons for losing the band were diverse, slippage, erosions, intolerance, dissatisfaction.

Conclusion: Laparoscopic adjustable gastric banding seems to be an effective treatment for morbid obesity in the first 10 years with increasing removal rate and dissatisfaction after that.

Disclosure: No conflict of interest declared

RS12.05

Band to bypass versus Band to Sleeve: 5 years outcomes

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Background and Aims: In the past decade laparoscopic adjustable gastric banding (LAGB) was one of the most popular bariatric procedures in Europe. However long term LAGB has a high rate of failure and conversion (40–53%) due to insufficient weight loss or complications. In case of conversion many procedures have been proposed after LAGB. Reported weight loss and co-morbidity outcomes of LAGB patients converted to LRYGB or LSG are similar to the results for primary procedures, but it is still not clear which is the best option. The aim of this study was to compare results of LRYGB and LSG performed as a revisional procedure for failed LAGB

Material and Methods: A retrospective analysis of a prospective maintained database was conducted to find all patients converted from LAGB to LSG or LRYGB between January 2000 and December 2013. Clinical data collected were: age, sex, body mass index (BMI) and body weight at primary and revisional operations, indications for revision, early and late complications, excess weight loss % (%EWL) and total weight loss % (%TWL) at 1, 3 and 5 years after conversion. The ANOVA test was performed to compare weight loss outcomes

Results: Fifty-one patients were included in the study, 43 females and 8 males. Twenty-four patients were converted to RYGB and 27 to LSG. The indication for conversion was insufficient weight loss in 35 patients and complications in 16 subjects. There was no significant difference in age, BMI and weight in the two groups at baseline and conversion. EWL% was comparable at 1, 3 and 5 years, while TWL% resulted significantly higher in patients converted to LRYGB at 1 and 3 years. Thirty-five patients received a single step conversion, while 16 were revised in two stages; no leak or major postoperative complication was observed.

Conclusion: LAGB can be safely converted to LRYGB or LSG in one or two stages. No significant difference in weight loss was found after a 5-year follow-up.

Disclosure: No conflict of interest declared

RS12.06

Banded versus non-banded laparoscopic gastric bypass: 434 consecutive patients with a minimum 5 y follow-up.

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Background and Aims: Weight regain after a standard gastric bypass is a well-known problem in around 30% of these patients. We started with the banded gastric bypass (BGB) in 2006.

Material and Methods: Between June 2002 and March 2015, 1288 GB operations were performed: non-banded gastric bypass (NBGB) in 316 patients and BGB in 972 patients. We present a cohort study comparing 434 consecutive patients (280 NBGB / 154 BGB) with a minimum follow-up of 5 years.

Results: The evolution of % excess weight loss: at 1 y 73 / 76, at 2 y 74 / 78, at 3 y 71 / 78, at 4 y 69 / 77 and at 5 y 66 / 79. From the 3rd year there was a weight regain in the NBGB group which continued till the 5th year. There was none important weight regain in the banded group with the band intact. The late dysphagia was acceptable and patient appreciation was rated 'very good' in 95% of banded surgery.

Conclusion: These results show that the weight loss at 5 years is better after a BGB. There were no re-operations in the BGB group because of weight regain in 5 years against 5% in the NBGB group. Since the low percentage of band related problems (no migration in our study and only 3 bands removed) we suggest always performing a BGB which is now the policy in our bariatric centre.

Disclosure: No conflict of interest declared

RS12.07

The significant improvement of quality of life in morbidly obese patients after laparoscopic sleeve gastrectomy

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Background and Aims: Quality of life (QoL) is a term created to reflect people's levels of happiness and satisfaction as regards both their lives and the consumption of public goods and services. Obesity is a disease of epidemic dimensions; a lifestyle disease. The World Health Organisation summarises obesity as a disease which could negatively affect the health. Social, psychological and financial issues among the obese could also adversely affect their quality of life.

Bariatric surgery has been proven to be the treatment of choice in morbidly obese patients with marked and durable effects. Its objectives are the weight loss, health improvement and improvement in the QoL.

This was the first study regarding bariatric surgery ever conducted in Cyprus. Its aim was to evaluate the perception of the QoL of morbidly obese patients before and after laparoscopic sleeve gastrectomy and to test the hypothesis that bariatric surgery improves quality of life.

Material and Methods: This is a prospective cohort study. The survey was conducted between January 2012 and March 2014 in the Nicosia General Hospital. 108 morbidly obese patients who underwent or were eligible to undergo laparoscopic sleeve gastrectomy were included in the survey protocol after fulfillment of the protocol criteria and completion of the SF-36 questionnaire. Statistical analysis was performed using the SPSS package and the internal consistency was calculated using the Coefficient Cronbach's Alpha.

Results: The correlation of QoL with demographic data like BMI, age, gender, marital status and employment was examined. The overall perception of QoL preoperatively was dramatically impaired. After the operation all the parameters improved significantly. There was also statistical significance between QoL and BMI, between QoL and sex and between QoL and employment. The BMI reduced from 48,64 to 33,27 ($p = 0,000$) and EWL increased to 68,40% ($p = .000$) 12 months postoperatively respectively.

Conclusion: QoL is adversely affected in morbidly obese patients who seek surgical help. Bariatric Surgery has seriously helped these patients lose a lot of their excess weight, and has dramatically improved their quality of life postoperatively.

Disclosure: No conflict of interest declared

Friday, 3 June, 2016

RS21: IFSO–EC Session – How different national health care systems influence quality the management of the bariatric patient

RS21.01

Bariatric surgery care in Sweden

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Background and Aims: Sweden has a long tradition of bariatric surgery (BS) but the number of procedures was only ~700/year until 10 years ago. After a governmental HTA and the publication of results from the SOS-study regarding mortality, cancer prevention, cardiovascular events, and diabetes BS became accepted by the general medical profession, media, and health politicians and a rapid increase occurred, reaching its peak at year 2011 with 8300 operations followed by a decline to about 6300 at 2015. This corresponds to ~65/100 000 inhabitants. Gastric bypass has been the most common procedure (~95%), but since 2013 there has been a rapid increase of sleeve gastrectomy (26% 2015).

The national health system is decentralized and organized by 21 self-governing counties, which independently decide taxes. This explains regional differences in the frequency of surgery, follow-up, and waiting time.

The government tries to keep a central unifying role by guidelines, law framework, and by comparing outcomes. The professional societies and the national quality registries also play an important role in this aspect.

SOREg – the national quality and research registry for BS – covers since 2010 99% of the procedures and 100% of the departments. SOREg regularly reports open, fully transparent, in detail results for every unit. This has led to a rapid spread of best practice with decreasing figures of complications, better results and a more efficient care.

As shown by SOREg the care perioperatively and during the first 1–2 post-operative years are efficient, equal and with excellent results. The problem of Swedish BS is the poor long-term follow-up. The primary health care system is weak and has a lack of doctors. The surgical departments have not had the task and the resources to take responsibility for the patients for more than 1–2 years. Many patients has not understood the importance of yearly follow-up of co-morbidities which can relapse, of new surgically induced problems such as alcoholism, bone demineralization, anemia etc. This is the challenge for BS in Sweden.

Disclosure: No conflict of interest declared

RS21.02

Bariatric surgery care in UK

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Background and Aims: Although the UK has nearly the highest rate of severe and complex obesity worldwide, commissioning of bariatric surgery in the National Health Service (NHS) is variable. There are about 6,000 publicly funded patients operated per year, mostly in England, with very little surgery being done in Scotland and Wales, and none in Northern Ireland. Barriers to access include the policy that patients must first be assessed in a 'Tier 3 Weight Assessment and Management Clinic' that includes a bariatric physician. Although all agree that medical/physician care, in addition to surgery, is optimal for long term care, local Clinical Commissioning Groups (there are 220 in England) do not have to commission Tier 3, and therefore there may be no referrals for 'Tier 4' bariatric surgery [1].

The National Institute of Health and Care Excellence (NICE) lowered the BMI threshold for patients with onset of type 2 diabetes within 10 year to 30kg/m² in 2014 [1]. A potential lever to mandate commissioning is the NICE Quality Standards framework that mandates access to surgery assessment for patients meeting the BMI thresholds, and these will be published in 2016 [2]. NICE-accredited commissioning guidance endorsed by 10 royal colleges and national societies specified criteria for access to surgery and how pre- and post-operative care should be provided long term [3]. Neither document has so far influenced referral rates for surgery, which fell by 31% over 3 years to 2015, and nor has publication of a low mortality rate of 1.7/1,000 at 30 days.

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- 1 Koehring M. Confronting obesity in the UK. The need for greater coherence. 23 February 2016. <http://www.eiperspectives.economist.com/sites/default/files/images/ConfrontingobesityintheUK.pdf>.
- 2 Obesity: clinical assessment and management. NICE quality standard. Draft for consultation. December 2015. <https://www.nice.org.uk/guidance/GID-QSD128/documents/draft-quality-standard>.
- 3 Welbourn R, Dixon J, Barth J, Finer N, Hughes C, le Roux CW. NICE-Accredited Commissioning Guidance for Weight Assessment and Management Clinics: a Model for a Specialist Multidisciplinary Team Approach for People with Severe Obesity. *Obesity Surgery* 2016; 26: 649–659 doi 10.1007/s11695-015-2041-8

Disclosure: No conflict of interest declared

RS21.03

Bariatric surgery care in Germany

[no abstract]

RS21.04

Bariatric surgery care in Lithuania

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Background and Aims: Prevalence of morbid obesity increases and healthcare systems of various countries faces the challenge of providing an up-to-date care. Bariatric surgery is the most efficient treatment, however it is associated with increased costs. The aim of the review is to present current situation of bariatric surgery in Lithuania, the country in transition from “Semashko” centralized healthcare system.

Material and Methods: The data were searched for prevalence of obesity, number and type of bariatric procedures and the access to bariatric surgery. The access to bariatric surgery was evaluated by estimating timeliness, surgical capacity, safety and affordability.

Results: Lithuanian population was 2.97 million in 2013. Prevalence of obesity among adults in 2010 was 19% in men and 20% in woman. In 2014 two-hundred forty bariatric operations were performed. Laparoscopic adjustable gastric banding (LAGB) – 63, laparoscopic Roux-en-Y gastric bypass (LRYGB) – 103, laparoscopic sleeve gastrectomy (LSG) – 6 and laparoscopic gastric greater curvature plication (LGGCP) – 68. Operations were performed in 4 centers. Ninety-five percent of operations were done in high and medium volume centers. Average waiting time was 4 weeks. Bariatric surgery is reimbursed according to DRG system depending on comorbidities and the payment is in a range of 600 – 1500 euros. If the patients apply for LAGB, LRYGB or LSG they need to pay the price of single use instruments, which exceed the average salary in the country by three times. In 2015 HTA of bariatric surgery for the treatment of type 2 diabetes mellitus was done and the conclusion was reached that it is effective treatment method. However, third party payers had not responded to it so far.

Conclusion: The prevalence of obesity in Lithuania is high, however the number of bariatric procedures is relatively low. The country has an established network of bariatric surgery centers that may meet the demand of bariatric surgery if reimbursement issues will be solved.

Disclosure: No conflict of interest declare

RS22: IFSO–EC Session – Innovation vs evidence

RS22.01

Innovation vs evidence

Olbers T

Sweden

New surgical techniques and devices are rapidly being introduced in obesity treatment. New technology has the potential to improve the quality, efficiency and safety. However, they can introduce new risks and unforeseen dangers.

This talk will focus on how the currently used established techniques in bariatric surgery have been evaluated and supported by evidence, but also how trends among surgeons and opinions strongly has affected the use of bariatric techniques.

My conclusion is that future establishment of new techniques in bariatric surgery and endoscopic devices and techniques will need to undergo the same steps in evaluation as new medications. First there need to be “proof of concept= feasibility”, secondly larger safety and efficacy studies, thirdly the technique need to be tested against “gold standard” treatment, and lastly registries over thousands of procedures need to be followed in order to pick up uncommon but important serious adverse events.

An example given is how Sweden now evaluate how Sleeve gastrectomy compares to gold standard Roux-en-Y gastric bypass. In a 4000 sample trial we will randomise patients to Sleeve or Bypass and evaluate the primary endpoint after 5 y. The primary endpoint is a combination of weight control (Sleeve <5% inferior= non inferiority) and frequency of serious adverse events (Sleeve 35% less than Bypass= superiority). In addition, a broad range of secondary endpoints will be evaluated.

The time where new techniques, devices and surgical procedures could be established based on enthusiasm and initial positive data is over. We need to not only focus on what’s achievable, but as important focus on our most important ethical oath; primum non nocere (do not harm).

RS22.02

Gastric plication: Innovation versus Evidence

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Background and Aims: Gastric plication not a new procedure. In 1969 Kirk published an article „An Experimental Trial of Gastric Plication As A Means Of Weight Reduction In The Rat“ in the British Journal of Surgery, followed by Tretbar et al. “Weight reduction:gastric plication for morbid obesity” (J Kans Med Soc, 1976). Laparoscopically was gastric plication started by Talebpour in 2000.

Laparoscopic gastric plication (LGP) reflects the fact, that yet there’s not available ideal bariatric/metabolic operation to suit every and each patient and to fit and meet his/her individual metabolic, psychological, behavioural and eating profiles.

From this perspective, LGP exhibits several important criteria which allow to consider this procedure as another treatment option for obesity and related metabolic disorders. Thus, LGP is low invasive, does not require any kind of gastric or intestinal resection, there’s no implant used, is metabolically and weight loss effective, is associated with low rates of

complications and requires short postoperative hospital stay. Potentially LGP is fully reversible.

Several authors, i.e. Talebpour, Yui Ji, Skrekas, Antiochos, Fried and others report LGP as weight loss effective (excess weight loss fluctuating around 50% three to five years postoperatively), as metabolically effective, leading to T2DM remission in > 60% diabetic patients 48 months after operation. Pooled data from different studies show that LGP is safe, with mortality < 0.2%, and long term (> 5 years) reoperation rate of approx. 3%.

There's no ideal, life-long lasting and effective bariatric and metabolic procedure. LGP is gradually gaining position in a frame of low invasive operation with acceptable long(-er) term bariatric/metabolic treatment results. LGP with regards to safety and efficacy is positioned between gastric banding and sleeve gastrectomy.

Disclosure: No conflict of interest declared

RS22.03

SADI-s: Single Anastomosis Duodenal with Sleeve

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Background and Aims: SADI-s is a novel bariatric operation based on the principles of biliopancreatic diversion (BPD). The reason for developing a new technique or for modifying a pre-existing one was to simplify the procedure, to decrease the potential complication rate, and to maintain or even to improve, if possible, the outcomes of the original operation.

In this way, our group developed 9 years ago a new technique (1), originally based on the duodenal switch (DS), in which only one anastomosis is performed, the "Single Anastomosis Duodeno-Ileal bypass with Sleeve gastrectomy" or SADI-s [1] (Fig. 1).

In the present lecture, we plan to revise our results in 256 patients submitted to SADI-s procedure. The most important comorbidities were: Hypertension (100% of the patients) and Type 2 Diabetes Mellitus (T2DM) in 40% of the patients. was 2 years.

There was no mortality, and there were no intraoperative complications. No leaks have been detected in the duodeno-ileal anastomosis or in the duodenal stump, which is never invaginated.

Oral intake was resumed after 1–2 days after the operation. Median in-hospital stay was 6 days. Mean bowel movements is 2.7. As a single value hardly reflects the exact nutritional state, several markers are generally evaluated, including blood cells counts and different protein levels. We detected few alterations in red blood cell counts: ten percent of the patients had low levels of hemoglobin or hematocrit, and 22% had low iron levels. In summary, in our opinion, SADI-S comprises all the possible mechanisms involved in obesity related metabolic comorbidities improvement, which are a moderate gastric restriction responsible of a moderate reduction in the caloric intake, a bypass of the duodeno-pancreas, a rapid entrance of undigested chymus into the distal intestine, selective fat malabsorption, and in the short run, maintained weight loss. In this way it is easily explained why all diabetic patients have completely resolved their condition after the sixth postoperative month and with no need of specific therapy or diet they are able to maintain normal levels of glycosylated hemoglobin. The same arguments explain the improvement of the lipidic profile.

Conclusions: SADI-S is a nice alternative, based on solid physiologic principles, to be implemented as a bariatric and metabolic procedure in overweight and more "metabolic" patients.

Disclosure: No conflict of interest declared

RS22.04

Endobarrier

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Background and Aims: In search of less invasive treatments of obesity and its co-morbidities several endoscopic devices have been developed. The duodenal-jejunal bypass liner Endobarrier is an impermeable fluoropolymer sleeve of 60 cm that is placed endoscopically and is kept in place with a nitinol anchor with barbs that is positioned in the duodenal bulb. The sleeve blocks contact of all nutrients with the duodenal wall whereas bile and pancreatic juices pass on the outer site of the sleeve to the more distal jejunum. To date more than 3000 sleeves have been placed with acceptable to good weight loss results and significant improvement of metabolic disorders such as diabetes mellitus.

CE mark was achieved in a multicenter randomized study in the Netherlands. In this study the average % excess weight loss (%EWL) in a group of 26 patients was 19% after 3 months compared to 6.9% in the control group. In a second study with the second generation device (improved anchor) treatment was extended to 6 months and weight loss obtained was 32%EWL compared to 16%EWL in the control group [6]. The second generation device is approved for 1 year treatment. About 70% of the treated patient will be able to complete 1 year. This results in a consistent weight loss of over 45%EWL.

Complications are migration of the Endobarrier (1.6%), bleeding (1.5%) intolerance (1.6%) and obstruction (0.8%) which usually results in sleeve removal. Other more recently reported complications are liver abscesses (0.9%) and acute pancreatitis (0.3%). To date no fatal complication occurred.

Metabolic effects are significant. In a multicenter randomized study in the Netherlands there was a significant improvement in glucose homeostasis with a reduction of HbA1c from 8.3 (7.7–9.0) to 7.0% (6.4%–7.5%) after 6 months of treatment compared to 8.3 (7.7–8.9) at baseline to 7.9% (6.6%–8.3%) at 6 months in control patients.

The endobarrier is safe and effective in the treatment of obesity and obesity related morbidities.

Disclosure: Consultant and proctor to GI Dynamics

RS22.05

Other novel endoscopic procedures

Miller K.

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Background and Aims: The pose™ procedure is a minimally invasive technique which uses the g-Cath™ EZ Suture Anchor, part of the Incisionless Operating Platform™ (USGI Medical®, San Clemente, CA, USA) to treat patients with Class I and II obesity. During the procedure, an endoscopist or bariatric surgeon per-orally places full-thickness plications in the gastric fundus and distal body to modify gastric capacity and function.

Objectives: The purpose of this study was to compare safety, satiety, and weight loss outcomes of subjects undergoing pose plus diet and exercise to those following diet and exercise alone.

Material and Methods: A prospective, multi site, open label, randomized controlled trial was conducted in 3 EU countries. Following Ethics approval, 44 patients with class I-II obesity were randomized in a 3:1 ratio (pose with diet and exercise counseling; diet and exercise counseling only [control]). Total body and excess weight loss (%TBWL, %EWL) were assessed at 12 months.

Results: Forty-four patients were randomized (77.3% female; mean age 38.3 ± 10.7 years; body mass index, 36.5 ± 3.4 kg/m²) to pose (n = 34) or control (n = 10) in 3 centers. Mean pose procedure time was 51.8 ± 14.5 minutes; pose patients received a mean 8.8 ± 1.3 fundal and 4.2 ± 0.7 distal body plications. Twelve-month TBWL was: pose group, 13.0% (EWL: 45.0%), n = 30 vs. control group, 5.3% (18.1%), n = 9, a significant mean difference of 7.7% (95% CI 2.2, 13.2; p < 0.01). At 12 months, pose pa-

tients showed significant reductions in satiety parameters ($p < 0.001$) compared to baseline. No serious device- or procedure-related adverse events occurred.

Conclusion: Analysis of the 12-month endpoint data collected during this randomized controlled trial showed that patients treated with posexperienced a 2.5 fold greater greater weight loss than patients who received diet and exercise guidance alone. In addition, at 6 and 12 months, pose procedure patients showed significant reduction in satiety parameters. These findings substantiate a clinical and statistically significant effect of the pose procedure on patients suffering from Class I and Class II obesity versus diet and exercise alone.

Acknowledgement: Support and Study funded by USGI Medical®, San Clemente, CA, USA

RS26: IFSO–EC Video Session – How do I do it

RS26.01

Tactical issues in reoperation – overview

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Background and Aims: The reoperation should be considered, if complications occur or the recurrence of further successful treated diseases are present. The indication should be done carefully and under the aspect of a higher incidence of complications, morbidity and mortality.

The laparoscopic access has more benefits for the patient, than the open one.

Objectives: In the COE 38% of all interventions were reoperations ($n = 530$). The strategy in all interventions was the laparoscopic approach. The tactical issues were analyzed on the basis of the surgical reports. Complex reconstructions 114 followed by 86 hiatoplasties, and changes from VBG into MGB (2) or RNYGB (2), MGB into RNYGB (4), Sleeve into MGB (17) and Sleeve into RNYGB (19).

Results: The laparoscopic approach was successful in 99,2%. The most important factor seems to be unlimited OR-time. From the reports were analyzed, that the locations of the anatomical landmarks is the most important starting point:

- left liver lobe
- right and left crus of the diaphragm
- angle of HIS
- pylorus
- crow foot
- A gastroepiploica
- spleen

Reference:

Weiner RA, El-Sayes IA, Theodoridou S, Weiner SR, Scheffel O. Early post-operative complications: incidence, management, and impact on length of hospital stay. A retrospective comparison between laparoscopic gastric bypass and sleeve gastrectomy. *Obes Surg*. 2013 Dec;23(12):2004–12. doi: 10.1007/s11695-013-1022-z.

Disclosure: No conflict of interest declared

RS26.02

Roux-Y Bypass

[no abstract]

RS26.03

Omega loop

[no abstract]

RS26.04

Sleeve gastrectomy

[no abstract]

RS26.05

SADI-s: How do I do it?

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Background and Aims: SADI-s is a novel bariatric operation based on the principles of biliopancreatic diversion (BPD). The reason for developing a new technique or for modifying a pre-existing one was to simplify the procedure, to decrease the potential complication rate, and to maintain or even to improve, if possible, the outcomes of the original operation.

In this way, our group developed 9 years ago a new technique originally based on the duodenal switch (DS), in which only one anastomosis is performed, the “Single Anastomosis Duodeno-Ileal bypass with Sleeve gastrectomy” or SADI-s.

In the present Video we will show the step by step approach to this surgical bariatric and metabolic procedure.

In our opinion, SADI-S comprises all the possible mechanisms involved in obesity related metabolic comorbidities improvement, which are a moderate gastric restriction responsible of a moderate reduction in the caloric intake, a bypass of the duodeno-pancreas, a rapid entrance of undigested chymus into the distal intestine, selective fat malabsorption, and in the short run, maintained weight loss. In this way it is easily explained why all diabetic patients have completely resolved their condition after the sixth postoperative month and with no need of specific therapy or diet they are able to maintain normal levels of glycosylated hemoglobin. The same arguments explain the improvement of the lipidic profile.

Conclusions: SADI-S is a nice alternative, based on solid physiologic principles, to be implemented as a bariatric and metabolic procedure in overweight and more “metabolic” patients.

Reference:

1 Sánchez-Pernaute A, Rubio Herrera MA, Pérez-Aguirre E, et al. Proximal duodenal-ileal end-to-side bypass with sleeve gastrectomy: proposed technique. *Obes Surg* 2007;17:1614–8.

Disclosure: No conflict of interest declared

RS26.06

Technique of laparoscopic duodenal switch

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Results: Laparoscopic biliopancreatic diversion with duodenal switch (DS) is a challenging procedure. In our experience it is preferable to perform the operation in 2 stages, i.e. first the sleeve gastrectomy and the DS itself at a later stage, after substantial weight loss. In the video we present the technique of one-stage DS, with special attention for the technique of duodenal dissection and transection. Two different approaches to the duodenum are presented: an anterior route and a posterior route, the latter through the lesser sac. In addition, several anastomotic techniques are presented both for the jejuno-ileostomy and the duodeno-ileostomy. Finally, special focus is put on the closure of the mesenteric and Petersen's defect.

Disclosure: Consultant for Ethicon and Medtronic

RS31: IFSO–EC Review Session – Long term side effects of bariatric surgery

RS31.01

Meal related symptoms after gastric bypass – dumping syndrome and reactive hypoglycemia

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Background and Aims: Meal-related symptoms after gastric bypass (GB) is poorly studied and although the etiology, time point and severity of dumping syndrome (DS) and hypoglycemia-like symptoms is distinctly separated from each other, they are often mixed together under the name of “dumping”.

Results: The Dumping Symptom Rating Scale, was developed to measure severity and frequency of nine dumping symptoms pre- and 1 and 2 years after GB in 47 adults and 82 adolescents on a seven-point Likert-scale, which ranges from “no trouble at all” to “very severe problems”. A high proportion of the respondents reported no symptoms affecting them negatively at all. However, 6–12% stated, quite severe, severe, or very severe problems regarding tiredness, need to lie down, nausea and fainting esteem.

To learn more of the patient's perspective of the phenomenon, 12 patients were interviewed 9 years postoperatively. The interviews were analysed by an inductive content analysis process. The results indicated that DS is perceived to give control of food intake and although the symptoms were very unpleasant, patients considered DS as a positive security against over-consumption.

Using a standardized liquid test meal with carbohydrates (CARB) and fat (FAT), blood parameters, pulse and perceived symptoms was assessed before and intermittent up to 180 minutes after finishing a 400 kcal/300 mL liquid meal in 12 GB patients. There was higher glucose levels after CARB up to 60 minutes and lower at 150 minutes compared to FAT, and insulin and pulse was higher throughout the experiment after CARB. Despite that CARB affected glucose, insulin and pulse significantly more than FAT, the FAT yielded as much perceived symptoms measured by Sigstad's dumping index.

Another eight GB symptomatic patients with hypoglycemia-like symptoms (SY) and eight asymptomatic patients (ASY) ingested the CARB test meal. Insulin, plasma-glucose and symptoms were measured intermittently up to 180 minutes postprandial. SY patients neither demonstrated lower plasma glucose nor greater insulin response compared to ASY patients in response to a liquid carbohydrate meal, but perceived more symptoms.

Disclosure: No conflict of interest declared

RS31.02

How to handle internal hernias in a high volume setting

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Background and Aims: Bowel obstruction due to internal hernia has become a major concern after laparoscopic gastric bypass. Studies presenting long-term data with high follow-up rate present internal hernia

in 8–16% of patients if the mesenterial defects are not closed primarily. Delay or error in treatment can results in increased morbidity or even mortality. The clinical diagnosis can be difficult to set at early stages resulting in a frequent use of diagnostic laparoscopy. Until recently, strong opinion but little data have been available on the issue “if and how” the mesenterial defect should be closed at the primary surgery. Further, when internal hernia occur there in no consensus about the important steps in the treatment.

Patients and Methods: Aleris Obesity Clinics have been high volume center since 2006 performing annually about 1500 laparoscopic gastric bypass operations by the same surgical team. Before June 2010 the mesenterial defects were left open resulting in diagnostic laparoscopy rate in 20% of patients due to suspected internal hernia. Since then the defects have been closed by use of clips (Endohernia® stapler).

Results: Closure of the mesenterial defects with clips seems to reduce the risk of internal hernia by factor of 4–5. The use clips are simpler and faster than as closure with non-absorbable sutures, and just as effective. Closure of mesenterial defects has a learning curve, especially precautions has to be taken in order to prevent kinking of the jejunojejunostomy. Video 1, demonstrate the technique of primary closure of the mesenterial defects. When internal hernia occurs a nasogastric tube should be inserted in order to prevent serious aspiration before the surgery. Video 2, demonstrate the technique and the important steps in treating internal hernia. Reposition of bowels start from the terminal ileum and running, braided, non-absorbable suture is used.

Conclusion: Internal hernia is a serious complication after gastric bypass and occurs frequently if mesenterial openings are left unclosed. Primary closure is mandatory and results in a significantly reduced risk of internal hernia. Early diagnosis and right treatment is of outmost importance.

Disclosure: No conflict of interest declared

RS31.03

Abdominal pain after bariatric surgery

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² Department of Surgery, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania

Background and Aims: The numbers of bariatric operations increases worldwide and more patients are seen with long-term side effects such as abdominal pain. From 15% to 30% of patients after gastric bypass will search for care up to 3 years after surgery and half of them because of abdominal pain. The aim of the current review is to present the most common causes of abdominal pain after bariatric surgery.

Material and Methods: The literature search was done to find out the most common causes of abdominal pain and to define diagnostic workup.

Results: The causes of abdominal pain maybe subdivided into behavioral/functional, biliary and related to surgical procedure. Each cause needs separate work-up and treatment. If the pain is continuous or intermittent, but lasts longer than 6 months it must be considered as chronic abdominal pain. Most patients with chronic abdominal pain have more than one cause and need evaluations of multidisciplinary team. First, surgical causes of abdominal pain must be excluded. It is worth mentioning, that subtle mechanic surgical issues, not apparent at regular CT, is often a part of the problem and need experienced bariatric surgeon to be involved in diagnostic and treatment process. Depending on the other symptoms, the patients must be evaluated for esophageal disorders, irritable bowel syndrome, inflammatory bowel disease, narcotic bowel syndrome, dumping syndrome and psychiatric diseases including depression and anxiety. Most of these patients are seen or treated by surgeons and thus it is important that surgeons have a basic knowledge about most common causes of abdominal pain including non-surgical causes. In order to achieve optimal results, the trustable relationship between the patient and the doctor must be established.

Conclusion: The abdominal pain after bariatric surgery is a rather uncommon problem. Various surgical and non-surgical causes of abdominal pain must be evaluated in diagnostic work-up of these patients. Patients with chronic abdominal pain usually has more than one cause and should be evaluated by multidisciplinary team.

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- 1 Cho M, Kaidar-Person O, Szomstein S, Rosenthal RJ. Emergency room visits after laparoscopic Roux-en-Y gastric bypass for morbid obesity. *Surg Obes Relat Dis.* 2008;4(2):104–9.
- 2 Kellogg TA, Swan T, Leslie DA, Buchwald H, Ikramuddin S. Patterns of readmission and reoperation within 90 days after Roux-en-Y gastric bypass. *Surg Obes Relat Dis.* 2009;5(4):416–23.

Disclosure: No conflict of interest declared

RS31.04

Too much weight loss

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Bariatric surgery is the most effective treatment for patients with severe obesity leading to sustained weight reduction, amelioration of obesity-associated co-morbidities and reduced mortality. At a population level Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) on average lead to a reduction in total body weight of 34% and 30% respectively at 12 months post-surgery¹. However, at the level of the individual patient weight loss at 12 months post surgery is highly variable with poor-responders (0 %WL) and extreme-responders (60% WL)². Both of these groups pose management challenges for the bariatric team.

Patients with extreme weight loss require urgent investigation and management to prevent and/or correct nutritional deficiencies. Once surgical complications have been excluded and mineral and vitamin deficiencies corrected, the question then becomes ‘How do we manage the patient with on-going anorexia and weight loss?’ It is often tempting to suggest psychological causes, however, before doing this we should revisit our current understanding of how these surgical procedures work.

It is now accepted that weight loss following RYGB and SG is mainly due to reduced energy intake as a consequence of reduced appetite and altered food preferences³. The mechanisms mediating these changes remain to be clarified. However, post-operative changes in circulating gut hormones, in particular peptide YY (PYY), glucagon like peptide-1 (GLP-1) and ghrelin, are suggested to play causal roles. Moreover, post-surgery studies have established that good-responders and poor-responders exhibit differential circulating gut hormone levels⁴. We also know from human infusion studies that high circulating levels of GLP-1 and PYY lead to profound anorexia, food aversion and often vomiting, akin to the clinical picture seen in patients with poor weight loss.

This presentation will discuss how to investigate whether high circulating levels of satiety hormones underlie extreme post-operative weight loss, the importance of avoiding high-energy dense liquid nutrient supplements and the subsequent management options.

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IFSO-EC ORAL SESSIONS

Thursday, 2 June, 2016

OS4: IFSO-EC Oral Session – Effect of surgery on T2DM / Managing poor weight loss

OS4.01

Differences in glucose and insulin dynamics between mini- and Roux-en-Y gastric bypass in euglycemic patients, submitted to a glucose challenge

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Background and Aims: Few data are available on the activity on glucose metabolism of the mini- or omega loop gastric bypass (OLGB) in normoglycemic patients.

Objectives: To evaluate mid-term differences in glucose and insulin dynamics between OLGB and Roux-en-Y gastric bypass (RYGB) in euglycemic patients, submitted to a glucose challenge.

Material and Methods: Consecutive, nondiabetic patients who had undergone OLGB 3 years earlier were matched with nondiabetic patients who had undergone RYGB in the same period and with healthy controls. Participants underwent oral (OGTT) and intravenous glucose tolerance test (IVGTT). Outcomes analyzed at OGTT and IVGTT were: progression of plasma glucose and insulin, changes in their concentration [calculated by area under the curve (AUC) at OGTT and IVGTT], incretin effect and hypoglycemia incidence.

Results: There were 14 participants in each group. At OGTT, progression of glucose and insulin were comparable after OLGB and RYGB, but different from controls. Overall glucose concentration did not vary across the 3 groups, but overall insulin concentration was significantly higher in both bypass groups, and highest in OLGB.

Severe hypoglycemia occurred in one out of two bypass patients.

At IVGTT no significant differences were found across the 3 groups and no participant experienced hypoglycemia.

The incretin effect, significantly higher in the bypass groups, was highest in OLGB.

Conclusion: After OLGB and RYGB plasma glucose and insulin progression was different from controls at OGTT but not at IVGTT and showed specific fluctuations, including a 50% incidence of hypoglycemia. Insulin hypersecretion and incretin effect tended to be more pronounced after OLGB than RYGB.

Acknowledgement: This study was supported by a grant from Ethicon Endosurgery

Disclosure: Dr Himpens is a consultant with Ethicon Endosurgery and with Covidien (Medtronic)

OS4.02

Insulin sensitivity and secretion in obese type 2 diabetic women after various bariatric operations

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Background and Aims: Laparoscopic gastric plication (P) is an emerging bariatric procedure. We aimed to compare the effects of laparoscopic gastric banding (LAGB) and biliopancreatic diversion (BPD) on insulin sensitivity and secretion with the effects of P.

Material and Methods: A total of 52 T2DM women (age: 30–66 years) were prospectively recruited into three study groups: (i) 20 in P; (ii) 16 BPD; and (iii) 16 LAGB. Euglycaemic clamps (glucose disposal per kg of fat free mass, M_k per FFM) and mixed meal tolerance tests were performed before (Exam 1), at 1 month after (Exam 2) and at 6 months after the bariatric operation (Exam 3). Beta cell function derived from the meal test parameters was evaluated using mathematical modeling.

Results: M_k per FFM increased significantly in all groups, especially after 1-month. Basal insulin secretion decreased significantly after all types of operations with the more marked decrease after BPD than after P or LAGB. Total insulin secretion decreased significantly only in BPD in Exam 2 vs 1 and in Exam 3 vs 1. Beta-cell glucose sensitivity did not significantly change after any type of the operation.

Conclusion: We have found similar improvement in insulin sensitivity in obese T2DM women after all types of operations during the 6-month post-operative follow-up of this study. Notably, only BPD led to the decrease in demand on beta cells (decreased integrated insulin secretion during the meal test), but without increase of the beta-cell glucose sensitivity.

Disclosure: No conflict of interest declared

OS4.03

Sleeve gastrectomy in patients with diabetes mellitus type 2. A case series of 260 patients

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Background and Aims: Type 2 diabetes mellitus (T2DM) and obesity are often associated in the same metabolic pathology and represent a significant public health problem. Although laparoscopic sleeve gastrectomy (LSG) is a relatively recent technique of bariatric surgery several studies have highlighted the effects in terms of resolution and improvement of diabetes.

Objectives: The objective of this study was to evaluate the effects of laparoscopic sleeve gastrectomy (LSG) on type 2 diabetes mellitus (T2DM) in obese patients at one year of follow up

Material and Methods: Prospective case series of 260 diabetes mellitus patients who went to SG between December 2009 to May 2015. There were 260 patients. Male: 107 patients, Female: 153 patients. 180 patients with 1 oral drug 58 patients with combinations of oral drugs and 22 patients with insulin requirement. Mean preoperative BMI of 40.6 ± 10 kg/m², mean fasting plasma glucose (FPG) of 149.2 ± 15.9 mg/dL, mean glycosylat-

ed hemoglobin (HbA1c) of 7.8%±1.4%, and a mean T2DM duration of 5 years. All patients had a 24 month follow-up.

Results: There where 237 patients (91.1%) discontinued antidiabetic medications 8 months after LSG (%EBMIL mean was 83.1 ± 24.2 (range 25.3- 133.7)%). HbA1c of 5.3%±.3%). 18 (6.9%) patients reduced the oral medicament. 5 (1.9%) patient continued with insulin. No new diabetic retinopathy occurred during the whole period of observation.

Conclusion: SG is a safe and effective treatment for obesity. This study confirms the efficacy of LSG in the treatment of T2DM and indicates that LSG can provide a significant percentage of treated patients with one year of remission of T2DM.

References:

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- 3 Efficacy of Bariatric Surgery in Type 2 Diabetes Mellitus Remission: the Role of Mini Gastric Bypass/One Anastomosis Gastric Bypass and Sleeve Gastrectomy at 1 Year of Follow-up. A European survey.

Disclosure: No conflict of interest declared

OS4.04

2-year post-operative weight-loss and glycaemic outcomes in patients with type 2 diabetes following Roux-en-Y gastric bypass and sleeve gastrectomy: The role of weight-loss

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Background and Aims: Data comparing the effect of Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) on type 2 diabetes (T2D) outcomes and the relationship between weight-loss (WL) and T2D remission are limited. Thus, we examined 2-year post-surgery glycaemia and WL outcomes in a cohort of obese T2D patients following RYGB or SG.

Material and Methods: We undertook a retrospective cross-sectional study of obese T2D patients who underwent RYGB (n = 107) or SG (n = 103) as a primary procedure. A pre-surgery T2D score encapsulating HbA1c, T2D duration, and medications was calculated (Table 1). Mean %WL and T2D outcomes were assessed at 2 years post-surgery. Complete remission was defined as HbA1c<6% off all medication for >1 year¹. Multivariate adjustment analysis was used to correct for baseline confounding factors (age, sex, BMI and T2D score). To examine the relationship between complete remission and %WL by procedure type, patients were divided into %WL tertiles and logistic regression analysis was undertaken.

Results: Pre-surgery the RYGB-group had a lower BMI, greater insulin usage and higher HbA1c (Table 2). 2 years post-surgery %WL was higher in the RYGB-group compared to the SG-group [26.6 (95% CI, 24.8–28.4) vs. 20.6 (95% CI 18.3–22.8), p < 0.001].

HbA1c was lower in the RYGB-group at 2 years post-surgery compared to the SG-group (RYGB HbA1c 5.0% vs. SG 5.4%, p < 0.05), the greater %WL in the RYGB-group accounted for this finding. Complete remission vs. no remission was more 3 times more common after RYGB than SG (Odds ratio [OR] 3.0 (1.3–6.9, p = 0.01), this finding was explained by greater %WL.

When stratifying by %WL tertiles, T2D remission was 11.1 times more common in patients in the highest %WL tertile compared to lowest [OR 11.1 (3.5–35.0), p < 0.0001] regardless of the procedure.

Conclusion: RYGB led to greater 2-year post-surgery %WL accompanied by superior T2D outcomes compared to SG. Our findings suggest that %WL plays a key role in determining glycaemic improvements at 2 years post-surgery, independent of procedure.

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Acknowledgement: Funded by the Rosetrees Trust

Disclosure: No conflict of interest declared

Score	0	1	2
HbA1c %	< 7	≥7 and <8.5	≥ 8.5
Duration (years)	< 1	≥ 1 and ≤ 5	> 5
Anti-diabetic medications	None	Oral agents	Insulin

Fig. 1.

Characteristic	RYGB-group	SG-group
Pre-surgery		
HbA1c (%)	7.8 (0.2)	7.4 (0.1) *
BMI (kg/m ²)	43.2 (0.6)	48.2 (0.8) ***
Age (years)	51.5 (0.8)	49.7 (0.9)
T2D duration (years)	5.6 (0.5)	4.7 (0.5)
Insulin usage (%)	26 (24.3%)	11 (10.7%) *
2 years post-surgery		
BMI (kg/m ²)	31.5 (0.5)	38.2 (0.7) ***
% weight-loss	26.6 (0.9)	20.6 (1.0) ***
T2D remission	60 (56.1%)	52 (50.5%)

Fig. 2.

OS4.05

Usefulness and reliability of upper gastro intestinal contrast studies in assessment of pouch size in patients with weight loss failure after Roux-en-Y gastric bypass

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Background and Aims: Weight loss failure or weight regain occurs in up to 25% of patients with a Roux-en-Y gastric bypass(RYGB). Postoperative anatomical changes, such as pouch or stoma dilatation, might contribute to this failure due to increased volume intake. The aim of this study is to assess the usefulness and reliability of upper gastro intestinal(UGI) contrast studies to detect pouch dilatation in patients with weight loss failure following RYGB.

Material and Methods: Retrospective case-control study of 101 patients presenting with weight loss failure between 2010 and 2015 (failure group) and a control group of 101 patients with adequate weight loss. Two trained researchers, blinded for the initial radiology report, independently reassessed all source images. Cut off point for pouch dilatation was set on pouch dimension transcending twice the adjacent vertebral height. Pivotal assessment by an expert radiologist was used in case of disagreement. Amount of weight loss and possible additional treatment was extracted from the electronic patient records.

Results: Systematic reassessment of the UGI contrast studies showed 23/101(23%) pouch dilatation in the failure group, compared to 11/101(11%) in the control group(p.0.024). Only a fair interobserver agreement was found(kappa 0.25). Revisional surgery was performed on 43/101 patients in failure group, including nonadjustable banding of the pouch(n = 11), adjustable banding(n = 29), laparoscopic pouch resizing(n = 6) and conversion to distal bypass(n = 3). There was no difference in return to adequate weight loss (>50% excess weight loss) between these patients and those managed conservatively(30% vs 28%). Patients with weight loss failure and detection of pouch dilatation on UGI were more likely to reach adequate weight loss following conservative treatment compared to surgical treatment(27% vs 8%).

Conclusion: Systematic reassessment of UGI contrast studies showed pouch dilatation in 23% of patients with weight loss failure after RYGB. However, the low interobserver agreement and the observed discrepancy in weight loss during follow-up greatly questions the reliability of this diagnostic modality.

Disclosure: No conflict of interest declared

OS4.06

Preoperative assessment of motivation is not predictive for weight loss after roux-en-y gastric bypass

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Background and Aims: Preoperative motivation is often considered supportive for postoperative weight loss in RYGB patients. It might play an important role in the eventual weight loss achieved.

Objectives: The aim of this study was to identify the predictive value of preoperative motivation for weight loss after RYGB.

Material and Methods: Data of 2824 patients, who underwent RYGB surgery and pursued an 18 month pre- and postoperative lifestyle change program at the Dutch Obesity Clinic, was collected prospectively. Variation in weight loss was assessed at 3 and 12 months postoperative. Motivation was determined during screening by a multidisciplinary team (psychologist, doctor, physiotherapist, dietitian) according to the stages of change in modifying behavior by Diclemente and Prochaska. Patients were allocated to one of the five stages; pre-contemplation, contemplation, preparation, action, maintenance.

Results: The number of patients allocated to each stage, pre-contemplation, contemplation, preparation, action, maintenance, was 270, 2376, 170, 8 and 0, respectively. ANOVA showed that differences in weight loss between each stage were not significant at 3 and 12 months for each of the four disciplines ($p > 0.05$ for all).

Conclusion: Preoperative motivation assessed by a trained multidisciplinary team was not predictive for weight loss outcome at 3 and 12 months after RYGB. Preoperative motivation might not be of much influence on the eventual weight loss achieved by the patient. An alternative explanation might be that preoperative low motivated patients become motivated by the lifestyle change program and thus rise to the same stage of motivation as the other patients.

Disclosure: No conflict of interest declared

OS4.07

A longer biliopancreatic limb Roux-en-Y gastric bypass as revisional bariatric procedure after adjustable gastric banding results in more weight loss: A randomized controlled trial.

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Background and Aims: For some decades, the laparoscopic adjustable gastric band (AGB) was one of the most performed bariatric procedure, which in the short term shows good results in terms of excess weight loss (EWL). In the long term, however, EWL and co-morbidity reduction are disappointing, and the LAGB does not seem to live up to expectations. These disappointing results have led to a high number of revisional procedures. The Roux-en-Y gastric bypass (RYGB) seems to be the revisional procedure of use. However, there is no uniformity on limb length for optimal weight loss and reduction of obesity related comorbidities.

Objectives: The aim of the present study was to evaluate the effect of a Long Biliopancreatic Limb RYGB (LBPL-RYGB) and Standard RYGB (S-RYGB) as revisional procedure.

Material and Methods: In this randomized controlled trial 146 patients, who underwent a RYGB as revisional procedure after AGB were randomized; 73 patients underwent a S-RYGB (Roux/Biliopancreatic limb 150/75 cm) and 73 patients a LBPL-RYGB (Roux/Biliopancreatic limb 75/150). The primary outcome was percentage EWL. Secondary outcomes were remission of obesity-related comorbidities and complication rates

Results: No patients were lost to follow-up. The baseline characteristics between S-RYGB and LBPL-RYGB were comparable, mean BMI was 42 ± 5 kg/m² and 118 (81%) patients were female. At 24 months an EWL of 58% for S-RYGB versus 67% for LBPL-RYGB was achieved ($p = 0.005$). All to obesity related comorbidities significantly increased, however, no significant differences were found between the two groups. In total 13 (9%) short term complication occurred, seven in the LBPL-RYGB group and six in the S-RYGB group. Five (3%) patients underwent a reoperation (2 LBPL-RYGB and 3 S-RYGB); two (1%) because of an anastomotic leakage and three (2%) because of a bleeding.

Conclusion: The RYGB seems to be a safe revisional bariatric procedure after AGB. It resulted in excellent weight loss and reduction of comorbidities. In addition, by increasing the length of the biliopancreatic limb even more weight loss was achieved.

Disclosure: No conflict of interest declared

OS4.08

Laparoscopic Roux-y-gastric bypass conversion of failed laparoscopic gastric band: Outcomes with up to five year follow-up

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Background and Aims: Laparoscopic adjustable gastric band (LAGB) carries a high rate of failure and re-operation. Laparoscopic conversion of failed LAGB to Roux-y-gastric bypass (RYGB) has been shown to be safe and feasible but long-term follow-up data is still limited.

Objectives: The aim of the present study is to evaluate the safety and effectiveness of Roux-en-Y gastric bypass after failed LAGB in our patient population.

Material and Methods: Using a prospectively collected database, we retrospectively reviewed data of patients who underwent LAGB revision to LRYGB at our institution by one surgeon between 2006 and 2014.

Results: A total of 58 patients underwent LRYGB after failed LAGB in our institution between 3/2006 and 12/2014. Of those, 20 patients (34.5%) had concomitant band removal while the rest underwent a two-stage LRYGB after a mean of 30 months after band removal. Most patients were females (65.5%). Mean age of the study group was 41.1 years. Band intolerance, insufficient weight loss and/or weight regain were the most common reasons for band removal.

Follow up was achieved in 84.5%, 82%, 83%, 95% and 76% of patients at 1,2,3,4 and 5 years after LRYGB. Percentage of excess weight loss (%EWL) was 62.8%, 68.1%, 64.2%, 63.8% and 61.3% at 1,2,3,4 and 5 years, respectively while percentage of total weight loss (%TWL) was 28.4%, 30.7%, 29.4%, 28.9% and 28.6% at the corresponding time periods.

Most common short-term complications were abscesses/leaks (5.2%) while the most common long-term complications were symptomatic gallstones necessitating laparoscopic cholecystectomy (5.2%), incisional hernias (5.2%) and small bowel obstruction (3.4%). Two-step procedures had higher short-term complications (21% vs 5%) as well as long term complications (26% vs 10%) than one-step procedures, but the differences were not statistically significant. No surgery-related mortality was recorded.

Conclusion: LRYGB appears to be a safe procedure with favorable weight loss outcomes at 5-years and can be considered as a good rescue procedure after failed LAGB.

Disclosure: No conflict of interest declared

OS5: IFSO–EC Abstract Session – Miscellaneous

OS5.01

12 month randomized sham controlled trial evaluating the efficacy and safety of targeted use of endoscopic suture anchors for primary obesity: The Essential study

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Background and Aims: Less-invasive options are needed to reduce the prevalence of obesity. The g-Cath™ EZ suture anchor, part of the Incisionless Operating Platform™ (USGI Medical®, San Clemente, CA, USA) is cleared to plicate gastric tissue endoscopically. The purpose of the study was to evaluate targeted anchor placement in the gastric fundus and distal gastric body (pose™ procedure) for weight loss.

Material and Methods: A randomized, blinded, sham controlled study was undertaken to compare safety and efficacy of the pose procedure against a sham procedure in subjects with Class I/Class II obesity across 11 sites with 2:1 active: sham randomization. 15 randomized endoscopies were performed at 12 months in active group to assess anchor durability/gastric integrity. Primary safety endpoint was a comparison between groups based on overall incidence of reported adverse events. Efficacy endpoints at 12 month unblinding included a responder rate defined as percentage of subjects with $\geq 5\%$ TBWL and the mean %TBWL delta between groups.

Results: 332 subjects were enrolled (active $n = 221$, BMI 36.0 ± 2.4 ; sham $n = 111$, BMI 36.2 ± 2.2). An average of 13.5 ± 1.4 suture anchors ($N = 220$) per active subject were placed with mean procedure time in active group of 39.7 ± 12.9 minutes. 11 procedure related SAEs (4.97%) occurred in the active group vs. 1 SAE (0.9%) in the sham ($p = 0.07$). All SAEs presented ≤ 1 week. 9 (82% of SAEs) were due to nausea, vomiting or abdominal pain, all resolving with conservative care. All SAEs resolved ≤ 3 months. 3 non-serious AEs (nausea, vomiting and pain) occurred at a statistically higher rate vs. sham. Mean %TBWL in the active group was 3.6X greater than the sham at 1 year ($p < .0001$). Responder rate in active was 1.9X the sham group ($p = 0.0010$). 15/15 endoscopies at 1 year showed intact plications with no gastric pathology.

Conclusion: The pose procedure appears to be a safe, efficacious endoscopic sutured weight loss procedure compared to lifestyle therapy alone with potential to be a beneficial weight loss option for patients.

Disclosure: Presenter was paid as a primary investigator in the Essential Study.

OS5.02

Sleeve gastrectomy in patients with BMI between 30 and 35, with 3 years of follow up.

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Background and Aims: Most of the diseases that accompany obesity start at a body mass index (BMI) of 30 Kg/m² or even lower. Laparoscopic sleeve gastrectomy (LSG) indications have been extended to special cases such as BMI below 35. We describe our experience in LSG in Class I obese patients.

Objectives: To describe our outcomes in patients with Grade I obesity, submitted to LSG in 3 years of follow up.

Material and methods: A retrospective descriptive analysis of patients with an initial BMI between 30 and 35 Kg/m² who underwent LSG between 2006 and 2013. We analyzed gender, age, comorbidities, excess of BMI, BMI loss percentage (EBL%) up to 36 months after surgery, comorbidities resolution, morbidity, and mortality. Postoperative success was defined as EBL% over 50%. Postoperative co-morbidities resolution was defined as absence of symptoms and medication intake.

Results: We operated 252 patients, 75% (188) females and 25% (64) men. Age range 15–70 years old. Mean preoperative BMI 32.3 Kg/m^2 (30–34.3), mean Excess of BMI 9.8 Kg/m^2 (11.8–7.5). Mean postoperative %EBL 77.24%, 95.78%, 82.3% and 72.35% at 6, 12, 24 and 36 months respectively. Surgical time: 86 min (40–120).

Comorbidities remission or improvement: Insulin Resistance remitted in 89.4%, dyslipidemia 52%, steatohepatitis 84.6%, hypertension 75%, GERD 65%, T2DM complete remission in 60% of the diabetic patients and improvement in 40% (medication reduction). Morbidity: 6 cases (0.8%), no leaks and no mortality.

Conclusion: BMI should not be the only indicator to consider bariatric and metabolic surgery. Performing LSG in patients with grade I obesity and metabolic syndrome is safe and effective. We still require further studies and longer follow-up.

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Disclosure: Medtronic, Educational Fellowship Grant

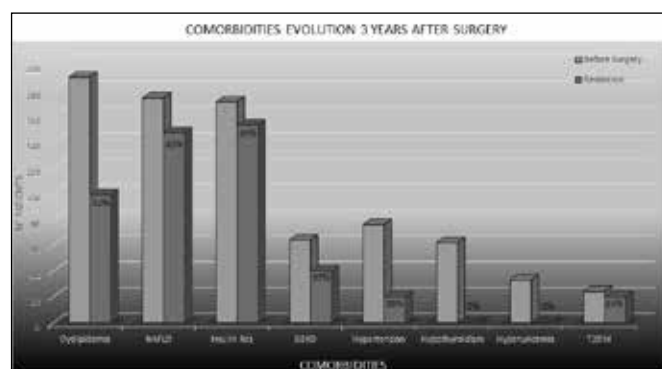


Fig. 1.

OS5.03

Effects of depressive disorders and their therapies on the postoperative weight loss after a Roux-en-Y gastric bypass: Do they matter?

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Background and Aims: During the last decades, the prevalence of both obesity and depression have drastically increased. Patients suffering from obesity tend to be at increased risk for depressive disorders. Depression itself, but even more the associated drug therapies for depressive disorders, are known to induce weight gain. Their effect on postoperative weight loss after bariatric surgery is however controversial.

Objectives: This study aims to demonstrate the effects of depression on postoperative weight loss after Roux-en-Y Gastric Bypass (RYGB) surgery. **Material and Methods:** We retrospectively gathered patients who between January 2010 and March 2015 were operated for RYGB surgery. Data concerning the psychiatric health and postoperative weight loss were collected from the Antwerp University Hospital medical records and based on self-reported history, pre- and postoperative medical investigations and medication schedules. Statistical analysis was performed using ANOVA and mixed linear model statistics. Patients suffering from other psychiatric disorders were excluded.

Results: During the inclusion period 459 patients met our criteria, of which 85 (17.9%) had a known history of depression. In our study population 59 patients (12.9%) were actively treated with an anti-depressant. Patients had a baseline BMI of 41.9 kg/m². For patients without a psychiatric history the weight decreased with 60.3% EBMIL and 74.5% EBMIL, six and twelve months after the RYGB. Patients with a depressive disorder lost at these time points respectively 56.1% EBMIL and 87.4% EBMIL. With a p-value 0.882 mixed linear model analysis could not demonstrate a significant weight loss after 12 months.

Conclusion: Depressive disorders and their therapies are frequently associated with weight gain, however the weight loss after RYGB surgery between patients with and without a history of depression does not differ. These patients therefore should not be refused undergoing bariatric surgery and their drug therapy can be continued postoperatively. Preoperative psychiatric screening nonetheless remains necessary.

Disclosure: No conflict of interest declared

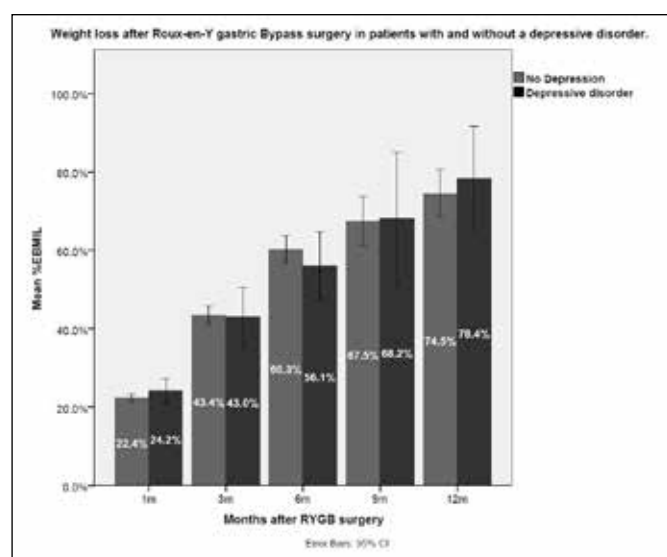


Fig. 1.

OS5.04

5-Year outcomes of laparoscopic greater curvature plication (LGCP) for treatment of morbid obesity

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Background and Aims: Laparoscopic greater curvature plication (LGCP) is an emerging metabolic/bariatric surgical procedure that requires no resection, bypass, or implantable device. In follow-up to our preliminary findings, we report 5-year LGCP outcomes in 244 morbidly obese patients.

Material and Methods: Body mass index (BMI, kg/m²) evolution, excess BMI loss (%EBMIL), excess weight loss, and total weight loss were recorded in patients between 2010–2011. Repeated-measures analysis of variance (ANOVA) was used to assess weight change over 5 years. Two-step cluster analysis was employed to develop demographic/clinical profiles relative to weight-loss success.

Results: Of patients with complete weight data at 5 years (86.9%, 212/244), mean age was 45.8 ± 10.9 years and mean baseline BMI, 41.4 ± 5.5 (81.7% women); 58 patients (27.2%) had type 2 diabetes. Mean operative time was 69.0 ± 11 minutes; mean hospitalization, 38.0 ± 8.5 hours. ANOVA

indicated significant BMI reduction out to 2 years, a plateau at 3 and 4 years, and a moderate but significant BMI increase at 5 years ($p < 0.001$). %EBMIL at 1, 2, 3, 4, and 5 years was: 50.7 ± 9.1, 61.5 ± 8.1, 60.1 ± 7.0, 58.5 ± 7.0, and 56.8 ± 6.3. At 5 years, according to a modified Reinhold classification, 79.2% (168/212) of LGCP patients were successful; 20.8% (44/212) experienced a suboptimal weight loss. Weight outcomes in the diabetic subgroup approached those of non-diabetics, and improvements in diabetic markers were sustained in >65% at 5 years. Cluster analysis identified 4 distinct LGCP patient profiles: successful females [50+ years and <50 years], less-successful females, and successful males. Nine patients (3.7%) had major complications; 6 (2.5%) required reoperation. There was no mortality.

Conclusion: At 5-year follow-up, LGCP proved to be safe and effective bariatric procedure, with 56.8% excess weight loss and a low rate of complications.

Disclosure: No conflict of interest declared

OS5.05

Pharmacokinetics and Pharmacodynamics of Rivaroxaban in Bariatric Surgery

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Background and Aims: Obesity is a risk factor for the development of venous thromboembolism. Rivaroxaban is a new oral anticoagulant that directly inhibits factor Xa. It has proven to be safe and effective in the (extended) prevention of venous thromboembolism after total hip or knee replacement. Until now there is no systematic investigation of Rivaroxaban in obese patients undergoing bariatric surgery. The aim of this clinical trial is to investigate pharmacokinetic (PK) and pharmacodynamic (PD) parameters of Rivaroxaban in the perioperative bariatric setting.

Material and Methods: This single-center open label phase 1 clinical trial included morbidly obese patients with scheduled bariatric surgery (6 patients with sleeve gastrectomy (SG), 6 patients with Roux-en-Y gastric bypass (RYGB)). All patients received a single oral dose of Rivaroxaban (10 mg) before and after bariatric surgery. PK and PD parameters were investigated the day before surgical procedure and on the third postoperative day.

Results: In total, 12 patients completed the study (6 SG, 6 RYGB). BMI was 44.6 (GS) and 38.5 kg/m² (RYGB). AUC before and after surgery was 773.6 and 874.3 mcg*h/L, respectively. Cmax before and after surgery was 135.9 and 137.3 mcg/L, respectively. Tmax before and after surgery was 1.5 and 2 h, respectively. PK data for SG patients: AUC before and after surgery was 794.3 and 950.8 mcg*h/L, respectively. Cmax before and after surgery was 135.3 and 170 mcg/L, respectively. Tmax before and after surgery was 1.5 and 1.5 h, respectively. PK data for RYGB patients: AUC before and after surgery was 753.5 and 755 mcg*h/L, respectively. Cmax before and after surgery was 136.5 and 110.8 mcg/L, respectively. Tmax before and after surgery was 1.5 and 2.5 h, respectively.

Conclusion: Rivaroxaban was well tolerated and safe. There is no significant difference in pharmacokinetic parameters before and shortly after bariatric surgery independent of the bariatric procedure applied (SG or RYGB). Based on these results rivaroxaban can be investigated in a phase 2 clinical trial in the perioperative bariatric setting.

Disclosure: No conflict of interest declared

OS5.06

Percutaneous electrical neurostimulation (PENS) of dermatome T6 with an ambulatory self-applied patch vs PENS of dermatome T6 with conventional procedure:

[no abstract]

OS5.07

Efficacy and safety of the duodenal-jejunal bypass liner: A prospective cohort study

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Background and Aims: The duodenal-jejunal bypass liner (DJBL)/ Endobarrier™ is an endoscopic, non invasive treatment for diabetes mellitus type 2 (T2DM) and obesity.

Objectives: The aim of this study is to evaluate the safety and effects on T2DM and obesity of the DJBL.

Material and Methods: Inclusion criteria for DJBL placement were: age 18–70 years, BMI 28–45 kg/m², and use of at least two different types of oral anti-diabetics or insulin. Patients using non-steroidal anti-inflammatory drugs or anticoagulant medication were excluded. The DJBL was explanted after an implantation period of 12 months, because of intolerance, or adverse events.

Results: Between March 2011 and January 2015, 200 patients underwent a DJBL implantation procedure of which 182 (91%) implantations were successful. In 18 patients the device could not be placed because of anatomical difficulties or bulbar ulcerations. In total 137 DJBLs were explanted at time of analysis, of which 48 were explanted before completing the entire implantation period because of intolerance or adverse events. Body weight decreased from 107.8 ± 17.6 to 95.7 ± 16.2 kg ($p < 0.001$), which is comparable to a total body weight loss of 11 ± 6.8%. Mean HbA1c decreased from 65 ± 17 to 59 ± 16 mmol/L ($p < 0.0001$). 28 Patients suffered from an adverse event, of which 13 patients (7%) developed gastrointestinal bleed and 5 patients (3%) acute pancreatitis. At time of the congress in June 2016 all results will be updated with all patients till January 2016.

Conclusion: The DJBL is a minimal invasive endoscopic treatment which leads to significant improvement of T2DM and weight. However, this treatment can be associated with serious adverse events.

Disclosure: No conflict of interest declared

OS5.08

Weight loss at three months after roux-en-y gastric bypass predicts long-term outcome

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Background and Aims: Previous studies show that there is a wide variety in weight loss response after Roux-en-Y gastric bypass (RYGB). Early identification of 'low responders' could allow additional lifestyle intervention and patient specific postoperative care to enhance weight loss.

Objectives: The aim of this study was to identify the predictive value of weight loss at 3 months postoperative for weight loss at 12 and 24 months.

Material and Methods: Data of 2416 patients who underwent RYGB surgery at the Dutch Obesity Clinic was collected, prospectively. Variation in weight loss was assessed at 3, 12 and 24 months postoperative and predictive factors to determine long-term outcome were used in multivariate analysis. Subsequently, weight loss results were divided into quartiles for each time of measurement.

Results: Patients in the first quartile (lowest % total body weight loss (%TBWL)) at 3 months were more likely to have a low %TBWL at 12 and 24 months ($p < .001$). Patients in the three other quartiles at 3 months

were unlikely to have poor weight loss at 12 and 24 months ($p = < .001$). Multivariate analysis, including baseline variables of BMI, age and sex, showed that weight loss at 3 months was an independent predictor for definitive %TBWL.

Conclusion: Weight loss 3 months after RYGB is a predictive factor for outcome at 12 and 24 months, especially for poor responders. Therefore, additional lifestyle changing intervention, on top of the regular follow up program, might enhance long-term weight loss in poor responders and thus improve treatment efficacy

Disclosure: No conflict of interest declared

OS6: IFSO–EC video session – Revisional surgery

OS6.01

Revision bariatric surgery: The gastric bypass as last resort

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Background and Aims: A 42 year male patient was referred to our institute. He underwent several bariatric procedures. He had in 2003, for a BMI of 45 (140 kg), a laparoscopic adjustable gastric banding. Initially with a good result and weight loss to 85 kg (BMI 27). In 2014 because of weight regain a gastric plication under the band was performed. Unfortunately there was an perforation at the plication site. So the band was removed, the perforation closed and covered with the fundus as created with a Nissenplication. In 2015 a new attempt for plication was performed, but because of gastric outlet obstruction they had to undo this procedure. This patient consulted our bariatric center with severe complains of food passage and the need to eat liquid meals. His current weight was 109 kg (BMI of 35.6). We performed preoperatively a gastroscopy and a barium swallow X-ray.

We successfully did a conversion to laparoscopic gastric bypass. In this video we want to show the several pitfalls we had to encounter. We strongly believe that the gastric bypass is the ideal salvage procedure in case for highly complicated bariatric cases.

Disclosure: No conflict of interest declared

OS6.02

Removing a gastric bypass and restoration of normal anatomic continuity

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Background and Aims: Gastric bypass is the gold standard in bariatric surgery with excess weight loss at 4 years of over 50% in morbidly obese patients. Its reversion is a rare procedure that can be performed by laparoscopy.

Objectives: It is the case of a 23 year-old woman who Roux-En-Y Gastric bypass elsewhere despite a psychiatric preoperative contraindication. This intervention caused subsequently chronic abdominal pain. A laparoscopy was performed and revealed an internal hernia that was reduced and an excess of jejunal stump below the gastrointestinal anastomosis that was resected. Despite this intervention, the patient did not notice any improvement and even rather described a new worsening with permanent abdominal pain. After multidisciplinary discussion and exclusion of all other possible causes, a complete reversion of the gastric bypass was performed 2 years after the initial intervention.

Material and Methods: Umbilical laparoscopy with a 12 mmHg pneumoperitoneum was performed and 12 mm paramedian trocar inserted

in left quadrant, 5 mm left subcostal, 5 mm in the left hypochondrium and a sub-xiphoid liver retractor. Adhesiolysis allowed to identify hiatal region, digestive loop, biliodigestive loop and common loop. No abnormalities were noted. A disconnection of the gastrointestinal anastomosis and Roux-en Y loop was performed, and continuity was restored by manual side-to-side gastro-gastric anastomosis and side-to-side mechanical jejuno-jejunal anastomosis.

Results: Postoperative course was uneventful. Radiological control on postoperative day 1 was normal (gastroesophageal transit). Refeeding was well tolerated and patient discharged after 7 days. During 1 month, the patient was relieved of her symptoms. She then developed severe abdominal pain again, for which we have no somatic explanation.

Conclusion: Roux-En-Y Gastric bypass is an intervention that can be reverted by laparoscopy as well. Indication of reversibility should be exceptional, and decided by a multidisciplinary team.

Disclosure: No conflict of interest declared

OS6.03

Video Presentation: Revisional surgery – failed gastric plication to laparoscopic sleeve gastrectomy

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Background and Aims: 26 years old female patient. BMI of 54 kg/m². She underwent laparoscopic greater curvature plication (LGCP) 2 years ago in an outside clinic. She presented with failure to lose weight. Only 2–5 kg weight loss was seen after the operation. No co-morbidities were present.

Material and Methods: Patient underwent re-do laparoscopic sleeve gastrectomy 4 months ago. 34F bougie was used for calibration.

Laparoscopic Echelon staplers 60 mm green cartridges were used for resection.

Patient was followed uneventfully postoperatively and discharged POD 5 after the operation.

She lost 22 kg after the operation in 4 months.

Disclosure: No conflict of interest declared

OS6.04

First Laparoscopic Biliopancreatic Diversion with Duodenal Switch in Ukraine, in patient with abdominal adhesions after destructive cholecystitis.

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Background and Aims: Biliopancreatic diversion with duodenal switch (BPD-DS), is not an easiest procedure. We show the BPD-DS technique, although with some degree of complexity, can be carried out through the laparoscopic approach, and special attention for the hand sutured duodenal enteroanastomoses.

Material and Methods: Three years before BPD-DS, laparoscopic sleeve gastrectomy (LSG) was done to the patient. In half a year after LSG patient was operated with 5 days destructive cholecystitis with peritonitis. Large laparotomy was made to make a cholecystectomy. This year patient underwent a BPD-DS and we try to follow the original method with small changes: -duodenal section 3 cm below the pilorus; -Ileenteroanastomoses at 100 cm of the ileocecal junction; 7-Passage of the alimentary limb (250 cm). The end to side duodenal entero anastomoses handily sutured was done in one with uninterrupted suture.

Results: First patient in Ukraine who underwent laparoscopic BPD with DS after previous laparotomy operations, start to eat on the next day after operation, and discharged on the 5 day because of excellent well-being. Patient displayed a lot of benefits after the laparoscopic procedure.

Conclusion: Laparoscopic BPD-DS is a technically feasible procedure with good result that should be integrated into a bariatric surgery procedures, and can be done even in patients with abdominal adhesions after previous laparotomies.

Disclosure: No conflict of interest declared

OS6.05

Immediate migration of the gastric tube following Laparoscopic Sleeve Gastrectomy and Hiatal Hernia Repair: A word of caution

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Background and Aims: There has been a recent trend to favor deliberate identification and repair of hiatal hernias even small ones during laparoscopic sleeve gastrectomy (LSG). This is based on controversial data suggesting that this approach reduces gastro-esophageal acid reflux disease (GERD) on long-term follow-up. There is potential added morbidity to this approach that is seldom presented; amongst which is migration of the gastric tube as a result of extensive hiatal dissection.

Objectives: The objective of this video is to show cases of acute migration of the gastric tube within days of LSG and HH repair showing contrast studies and CT scans diagnosing this entity. The video shows the technical elements in reduction of re-repair of the hiatal hernia in this setting.

Material and Methods: Three patients developed acute migration of the gastric tube after LSG with HH repair. All patients presented with severe nausea and vomiting and intolerance even to liquids. One patient's main presentation was left shoulder pain. Contrast studies were unusual but did not make an accurate diagnosis. CT scan was diagnostic. All patients were promptly re-explored once the diagnosis was made.

Results: Laparoscopic reduction of the gastric tube and re-approximation of the crura was accomplished successfully without significant morbidity. All patients recovered uneventfully and are doing well.

Conclusion: Hiatal hernia repair during LSG is not an entirely benign procedure, as extensive dissection of the hiatus predisposes the gastric tube to intra-thoracic migration. The indication for routine HH repair, especially for small hiatal hernias should be better defined based on good long-term outcome data.

Disclosure: No conflict of interest declared

OS6.06

Revisional laparoscopic gastric pouch resizing for insufficient weight loss after open Roux-en-Y gastric bypass

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Background and Aims: Bariatric surgery is currently considered the most effective treatment option for morbid obesity and the most commonly performed procedure in the world in 2013 was Roux-en-Y gastric bypass (RYGB)¹.

Inadequate weight loss is the primary indication for revisional bariatric surgery procedures^{2,3}.

Objectives: We report the case of a patient who underwent revisional laparoscopic gastric pouch resizing after failed open RYGB.

Material and Methods: 62 years-old male with previous surgery of open RYGB (initial BMI 49 Kg/m²) (year 2005). He complained for insufficient weight loss (BMI 36 Kg/m²).

Before revisional surgery, we performed a barium upper gastrointestinal study and the patient also had nutritional and psychiatric evaluation. The case was discussed at a multidisciplinary meeting and a laparoscopic exploration and gastric pouch resizing was decided.

Results: The patient underwent laparoscopic exploration in November 2015.

Laparoscopic pouch resizing was performed using a 5 port technique. Adhesions between the gastric pouch, Roux-en-Y limb and undersurface of the liver were dissected completely. A 36 Fr bougie was then inserted orally into the jejunum and under laparoscopic guidance. A new 20–25 cc gastric pouch was created starting from the stomach just above the gastro-jejunoanastomosis and across the gastric pouch up to the His' angle. A methylene blue leak test was performed.

The patient's postoperative course was uneventful. No leakage of contrast was observed in the upper GI contrast study.

Conclusion: Weight regain after RYGB is an increasingly common scenario faced to bariatric surgeon today².

Laparoscopic revision can be performed safely by well-trained and experienced bariatric surgeons in high-volume centers⁴.

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Disclosure: No conflict of interest declared

OS6.07

Reversal and conversion from an open banded transmesocolic Roux-Y gastric bypass to sleeve gastrectomy for severe hypoglycemia.

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Background and Aims: Some of the long-term complications after laparoscopic Roux-Y gastric bypass (LRYGB) as the syndrome of hypoglycemia, weight recovery, dumping and severe cachexia can be treated by reversing the normal anatomy (NA). A sleeve gastrectomy (SG) can be done during the same procedure to prevent the recovery of weight. The reason for this video is to describe the technical aspects of the evolution of the technical conversion from an open banded transmesocolic Roux-Y gastric bypass to sleeve gastrectomy for severe hypoglycemia.

Objectives: To show and establish technical aspects according to our series of cases.

Material and Methods: For this operation, we used a technique with five trocars. The procedure (Reversal + conversion to sleeve gastrectomy) reached reversal to full normal anatomy with sleeve gastrectomy added. The remnant gastric fundus devascularization can better show the limits of the gastric pouch. Understanding the transmesocolic approach is mandatory in order to perform the surgery. The video shows these aspects. The gastrojejunal transection of the anastomosis must be made above the band Gastric. We performed a simultaneous vertical gastrectomy. The manual regastrogastostomy was performed with the use of a 34 French bougie. The identification of anatomical structures and references is important. The SG typical, including complete desvascularització greater curvature and subsequent stapled resection. In that procedure, it is important to plicate the distal part of the stomach in order to avoid possible fistulas and leaks.

Results: The patient did not suffer any complications. Postoperative control was performed without any major complications. The patients was discharged after 4 days.

Conclusion: Converting previous transmesocolic banded GBP is challenging and remains a complicated procedure. Adding a SG to the reversal procedure can lead to possible leaks.

It is important to try to show important aspects of technical modifications made after the previous experiences.

Reference:

- 1 Vilallonga R, van de Vrande S, Himpens J. Laparoscopic reversal of Roux-en-Y gastric bypass into normal anatomy with or without sleeve gastrectomy. *Surg Endosc*. 2013 Dec;27(12):4640–4648.

Disclosure: No conflict of interest declared

OS6.08

Surgical revisional approach of gastro-oesophageal reflux after bariatric surgery

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Background and Aims: The relationship between obesity and gastro-oesophageal reflux is well documented. The increase in body mass index and the accumulation of visceral fat are associated with a risk two to three times greater of gastro-oesophageal reflux disease (GERD). Because of this association, several studies have been performed to evaluate the efficacy of the bariatric surgeries in the resolution of GERD complaints. In this context, gastric band (GB) and sleeve gastrectomy (SG) have shown that, most often, can aggravate or trigger the complaints. The Roux en Y gastric bypass (RYGB), of all the techniques, is the one that provides more efficient improvement of GERD complaints. However, even in cases there is no prior GERD complaints, there are peculiarities in the bypass that may determine the post-operative appearance.

Objectives: To present the different revisional surgical strategies used for the resolution of GERD complaints, as a common denominator to three different primary bariatric surgeries.

Material and Methods: Summary of 3 video records from patients submitted to revisional surgery after GB, SG and RYGB laparoscopically.

Results: In the three operated patients there was no weight regain and the GERD complaints were the indication for the revisional surgery. Surgical options were different depending on the primary bariatric surgery: band removal, cruroplasty and Toupet fundoplication after GB; cruroplasty and Hill gastropexy after SG; cruroplasty and partial resection of the enlarged gastric pouch after RYGB. In all cases there was resolution of GERD complaints.

Conclusion: Although bariatric surgery can provide an improvement of GERD complaints associated with obesity, when there is no pre-operative reference of such complaints, they may arise as a result of anatomical changes caused by various techniques used for the surgical treatment of obesity. In these cases, the resolution undergoes revisional surgery adapted to the primary operation, as the records presented here are just a few examples.

Disclosure: No conflict of interest declared

Intraoperative management of jejunojejunostomy error in laparoscopic Roux-en-Y gastric bypass: A potentially deadly, catastrophic event

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Background and Aims: Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) is a commonly performed bariatric procedure for the surgical management of morbid obesity. Yet it still possess certain kinds of complications. The aim of this video was to demonstrate the intraoperative management of a jejunojejunostomy error in LRYGB. To our knowledge, this specific type of error during operation of LRYGB has not been described previously.

Objectives: To show steps by steps in video how the error was fixed.

Material and Methods: We present the case of a 41-year-old male with a BMI of 43 kg/m² with cholecystolithiasis who underwent LRYGB and presented with jejunojejunostomy error during operation. Intraoperative revisional management was performed to fix the error.

Results: In this multimedia high-definition video, we present step-by-step the intraoperative management of jejunojejunostomy error during LRYGB. Procedures included (1) identify the error; (2) identify the biliopancreatic limb; (3) remove the hand-sewn reinforcement; (4) restore the original structure; (5) redo jejunojejunostomy correctly. The patient discharged 7 days after operation. In one year follow-up, the patient had a percentage weight loss of 73.1% without postoperative complication observed.

Conclusion: Jejunojejunostomy error is a potentially deadly and catastrophic event which requires immediate intervention to reduce the risk of serious sequelae. Precise identification of biliopancreatic limb and Roux limb is required during anastomosis. Intraoperative laparoscopic revision is feasible for jejunojejunostomy error if it is identified at the time.

Disclosure: No conflict of interest declared

Friday, 3 June, 2016

AS6: Bariatric Surgery in adolescents

AS6.01

Bariatric surgery in adolescents: PRO

[no abstract]

AS6.02

Bariatric surgery in adolescents: CON

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Adolescent obesity continues to be a significant public health issue. Despite that prevalence of childhood obesity in developed countries appears to be levelling off, severe obesity has become increasingly prevalent. In addition to being at increased risk of remaining obese as in adult, obese adolescents have and increased risk of having metabolic disorders, adverse cardiovascular disease risk factors and lower health-related quality of life. In light of this status prevention and treatment need to look at the multi factorial causes of obesity. It is necessary to treat obesity in a combined approach with many different components in the treatment programs, i.e. combining advice about exercise, diets and training in social skills or even drug treatment or surgery. Bariatric surgery is not generally endorsed under the age of 18 years, except in extreme cases. Bariatric surgery is not

without risk and nutritional deficiencies commonly exist in adolescents in the postoperative population. Concerns have been raised regarding the potential impact of micro-nutritional deficiencies and the impact of bariatric surgery on the skeleton with evidence of reduced bone mineral density and bone mineral content within a year following gastric bypass surgery. Also, little is known about the impact of bariatric surgery on psychosocial health in the adolescent.

Outcomes in term of fat loss, metabolic and quality of life improvement, reversal of obstructive sleep apnea, insulin resistance, type II diabetes, hypertension, and dyslipidemia are what treatment are looking for. Keeping in mind that bariatric surgery is a clinical and cost-effective treatment strategy for the morbidly obese, longitudinal studies and open dialogue within the pediatric community are needed in order to confirm significant benefits of this method.

AS6.03

Weight-related psychosocial problems in adolescents before and over 5 years after bariatric surgery – results from a Swedish nationwide study AMOS

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Background and Aims: Adolescents and adults presenting for bariatric surgery frequently report substantial impairment in social situations due to weight and body shape. Long-term outcomes for obesity-related problems after bariatric surgery in adolescents are unknown. Our aim was to evaluate outcome in obesity-related problems in adolescents over 5 years after undergoing gastric bypass surgery.

Material and Methods: We assessed 85 adolescents before and after bariatric surgery (67% girls, mean age at surgery: 16.8) from the AMOS-cohort. Obesity-related problem questionnaires (OP-14) were filled out at baseline (82/85), after one year (81/85), and 5 years after inclusion (75/85).

Results: Obesity-related problems were improved in adolescents from baseline to five years after gastric bypass ($p = 0.002$). Mean scores indicated moderate impairment (51.3 ± 26.3) at baseline and mild impairment (37.0 ± 28.5) five years post-surgery. However, more obesity-related problems were reported after five years compared with one year after surgery ($p = 0.006$, $ES = 0.34$). Operated girls reported more weight-related psychosocial impairment than operated boys, both 1 year (girls: 35.0 ± 25.8 , boys: 19.5 ± 16.6 , $p = 0.006$) and 5 years (girls: 43.2 ± 30.2 , boys: 25.0 ± 20.4 , $p = 0.007$) after gastric bypass. However, no significant sex differences were detected before surgery (girls: 55.06 ± 26.1 , boys: 43.5 ± 25.5 , $p = 0.062$). Five years after surgery, 22% of the operated adolescents reported severe obesity-related impairment in social situations, compared with 40% before surgery.

Conclusion: Adolescents' obesity-related psychosocial problems improved over 5 years after gastric bypass surgery, with a peak improvement 1 year after surgery, followed by a small decline. Future intervention studies should explore whether it is possible to prevent this decline. Girls reported being more concerned about their weight and body shape than boys after surgery, which is in accordance with other studies. More than 1 in 5 of the adolescents still reported severe impairment due to weight and body shape at 5 years after surgery, indicating that addressing this issue should be mandatory during follow-up.

Disclosure: No conflict of interest declared

The Adolescent Morbid Obesity Surgery (AMOS) study: Five-year outcomes following laparoscopic Roux-en-Y gastric bypass in a Swedish nationwide study

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Background: AMOS is a prospective, non-randomized controlled nationwide study, comparing laparoscopic gastric bypass (LRYGB) with medical intervention program for adolescents with severe obesity.

Methods: Eighty-one adolescents (mean 16.5 years; min-max 13–19) underwent LRYGB (surgery group), centralized to a single unit, with 5-year follow-up. Weight inclusion criteria were BMI ≥ 40 , or $\geq 35 \text{ kg/m}^2$ with comorbidities. Eighty adolescents, matched for age (± 2 months) and BMI, were identified from a national registry and prospectively followed as a control group.

Results: Weight: Across 5 years, mean weight and BMI in the surgery group decreased from 132.8 to 96.0 kg and 45.5 to 32.3 kg/m², respectively. Control subjects' weight increased from 122.6 to 135.3 kg, and BMI from 41.9 to 45.3 kg/m². This corresponded to -27.7% vs. +10.4% weight changes ($p < 0.0001$) and -28.8% vs. +8.1% BMI changes ($p < 0.0001$), respectively. Cardiovascular risk: LDL cholesterol decreased after surgery, while increasing in the control group (mean difference [MD] -0.47 vs. +0.25 mmol/L, $p < 0.0001$). Triglyceride levels decreased after surgery, while remaining unchanged in controls (MD -0.23 vs. -0.01 mmol/L, $p = 0.463$). HDL cholesterol changes were +0.25 (surgery) and -0.47 mmol/L (control, $p < 0.0001$).

Glucose homeostasis: Changes favored the surgical group regarding plasma insulin (MD -20.5 vs. -10.0 mU/L, $p = 0.050$) and glycated hemoglobin (HbA1c) (MD -1.1 vs. +3.4%, $p = 0.035$). However, paired samples at 1 and 5 years were available from 21 (insulin) and 13 (HbA1c) control patients.

Inflammation: High-sensitivity C-reactive protein levels reduced from 7.27 to 1.83 mg/L in the surgery group, remaining unchanged (8.66 to 8.65 mg/L) in the control group (MD -5.44 vs. -0.02 mg/L, $p = 0.005$). Paired samples were available from 16 control patients.

Adverse events: Fifteen (18.8%) laparoscopic remedial operations were performed, indications including internal hernia and symptomatic gallstone disease.

Crossover: Eighteen control patients (22.5%) underwent surgery (LRYGB) within 5 years of follow-up, owing to perceived treatment failure after having reached standard surgical eligibility (age ≥ 18 years).

Conclusion: Compared with conservative treatment, LRYGB was associated with substantial weight loss and sustained improvement in metabolic risk factors. Almost 1 in 7 operated adolescents needed a remedial surgical procedure. More than 1 in 5 conservatively treated adolescents underwent bariatric surgery within the 5-year follow-up.

Keywords: Bariatric surgery, adolescent, pediatric, gastric bypass, long-term, obesity

OS9: IFSO–EC Oral Session – Mechanisms of metabolic surgery / Effect of surgery on comorbidities other than T2DM

OS9.01

Subclinical hypothyroidism and its relation to obesity in patients before and after a roux-en-y gastric bypass

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Background and Aims: Subclinical hypothyroidism (SH), defined as a raised serum thyroid stimulating hormone (TSH) with a normal free thyroxine (FT4), is occasionally observed in morbidly obese patients. It is currently not known whether thyroid hormone treatment is indicated.

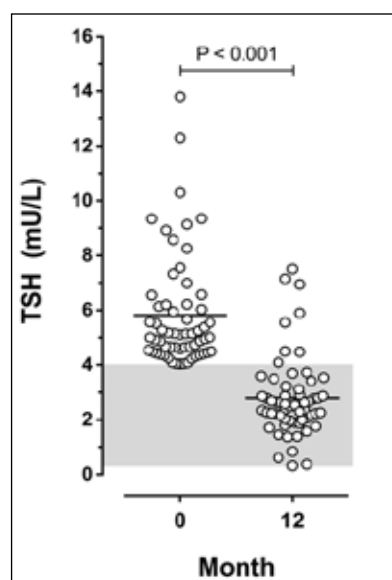
Objectives: The aim of the present study was to assess changes in thyroid hormone levels in thyroxine naïve patients with SH in response to weight loss induced by Roux-en-Y Gastric Bypass (RYGB) surgery.

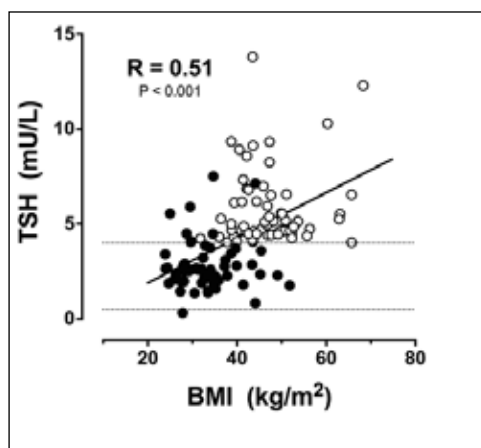
Material and Methods: Serum levels of TSH and FT4 were determined at baseline in 503 consecutive patients scheduled for RYGB. In patients diagnosed with SH de novo, these measurements were repeated 12 months after RYGB.

Results: SH de novo was present in 61 out of 503 patients (12%). Preoperative mean serum TSH was 5.8 ± 2.0 mU/L and FT4 15.4 ± 2.1 pmol/L. TSH Levels ranged from 4.04–13.80 mU/L (figure 1). BMI decreased from $47 \pm 8 \text{ kg/m}^2$ to $33 \pm 6 \text{ kg/m}^2$ ($p < 0.001$). This was associated with a decrease in TSH and FT4 to 2.8 ± 1.3 mU/L ($p < 0.001$) and 13.9 ± 2.3 pmol/L ($p < 0.001$, figure 2). SH Completely resolved in 53 (87%) of the de novo cases.

Conclusion: The prevalence of mild SH de novo is high in morbidly obese patients. After RYGB it resolves in approximately 90% of patients. This suggests that follow-up alone is sufficient in the majority of patients, and that preoperative treatment with thyroid hormone is not indicated in antibody negative SH. The remaining 10% requires additional screening by an endocrinologist because of an autoimmune disease.

Disclosure: No conflict of interest declared





OS9.02

Long-term effects of laparoscopic Roux-en-Y gastric bypass on metabolic syndrome in patients with morbid obesity

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Background and Aims: Diseases associated with obesity such as type 2 diabetes mellitus (T2DM), hypertension and dyslipidaemia are common and defined all together as Metabolic Syndrome (MetS). This study aimed to evaluate the long-term remission of MetS in patients with morbid obesity and to assess risk factors and complications in relation to LRYGBP on this patient group.

Material and Methods: This was a retrospective review of data collected prospectively in a single centre from 2005–2013 including 3795 gastric bypass operated obese patients. Metabolic Syndrome was defined according to the IDF Consensus Definition of Metabolic Syndrome from 2006.

Results: 79% of the patients were females, preoperative median age 42.4 years, and median BMI was 40.9 kg/m². MetS was diagnosed in 60% (2275/3795), occurred more frequently in males, at high age, body mass index and waist circumference. 27.5% of patients had impaired glucose metabolism, 40% hypertension and 30% dyslipidaemia.

Postoperative follow-up rate more than 5 years was 71% (595/839). 86.2% had resolution of MetS. After 5–9 years complete remission of T2DM was achieved in 78%, hypertension in 51% and dyslipidaemia in 89% of patients. Mean excess body mass index loss was significantly lower for patients with MetS (73.1%) compared to patients without MetS (75.6%) ($p < 0.01$). Early complications (leakage/haemorrhage) occurred in 1.2% (48/3975) and internal hernia in 7.8% (310/3975). MetS did not increase complication rates of LRYGBP when compared to obese individuals without MetS.

Conclusion: Gastric bypass surgery in obese patients is associated with a significant and sustained reduction in excessive weight. 86.2% of patients with MetS achieved complete remission and complication rates are low. Early bariatric surgery should be considered in patients with obesity and concurrent MetS.

Disclosure: No conflict of interest declared

OS9.03

Laparoscopic Roux-en-Y gastric bypass improves lipid profile and decreases cardiovascular risk. A 5-year longitudinal cohort study of 1049 patients

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Background and Aims: Dyslipidemia is a risk factor for atherosclerosis, contributing to cardiovascular death and disability.

Objectives: Our aim was to analyze the trends in the serum lipid profiles and their impact on the cardiovascular (CV) risk-reduction using the Framingham risk score (FRS) in patients 5 years after laparoscopic Roux-en-Y gastric bypass (LRYGB).

Material and Methods: All patients who underwent LRYGB for morbid obesity in our 2 hospitals between January 1999 and December 2009 were included. Data were collected prospectively.

Results: A total of 1049 patients were included in the analysis of 5-year results, 791 women, 258 men, with a mean BMI of 45.75 kg/m². Loss to follow-up at 5-year: 23% ($n = 240$). Patients with missing data had similar pre-operative lipid and weight values than those who had follow-up. Mean BMI fell to 29.3 kg/m² at 1 year, and increased to 31 kg/m² at 5 years ($p < 0.001$). All lipid values improved significantly. Total cholesterol and LDL levels dropped by 1 year from 5.4 to 4.48 and 3.2 to 2.41 mmol/l respectively, and showed a slight increase thereafter. TG levels dropped from 2 to 1.17 mmol/l at 1 year and did not change thereafter. HDL levels were continuously rising from preoperative 1.28 to 1.77 mmol/l at 5-year. There was no difference in lipid values at any time between sexes. Lipid profiles became more beneficial in patients who obtained a BMI < 35 kg/m² or an EBMI > 50%. Based on FRS, the impact of the amelioration of the lipid profile 5 years after LRYGB on the 10-year coronary heart disease and CV death risks was a 43%/-6% reduction, if we presumed that patients' other CV risk factors did not change over time except for aging ($p < 0.001$).

Conclusion: LRYGB for morbid obesity results in sustained excess weight loss and in the significant improvement of the lipid profile from the 1st to 5th year postoperatively. The postoperative improvement of lipid levels contributes to a significantly lower CV disease risk as from the 1st year after surgery.

Disclosure: No conflict of interest declared

OS9.04

Continuous positive airway pressure dependency for patients with obstructive sleep apnea after laparoscopic Roux-en-Y gastric bypass: Which patients?

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Background and Aims: Patients with severe obesity and obstructive sleep apnea (OSA) might decide to undergo bariatric surgery in order to improve this disease, or more specifically, to become independent of continuous positive airway pressure (CPAP) therapy. Knowledge of this topic is important for patient education on expectations of surgical outcome.

Objectives: To evaluate the prevalence and phenotypes of patients that were persistently CPAP dependent after bariatric surgery.

Material and Methods: Patients who underwent a laparoscopic Roux-en-Y gastric bypass, had a preoperative apnea-hypopnea-index (AHI) ≥ 15 /hour and of whom a follow-up AHI/hour was available were included.

ed. Predictive factors for persistent CPAP dependency were evaluated through multivariable regression analysis.

Results: Out of 437 patients, 205 underwent pre- and postoperative poly(somno)graphy; 232 (53.1%) were lost to follow-up. The study population consisted of 130 (63.4%) women and 75 men. Median AHI was 32.3/hour (range 15–138) and mean Body Mass Index 46 (standard deviation 7.2) kg/m². CPAP was no longer necessary in 152 (74.1%) patients; whereas, 53 (25.9%) remained CPAP dependent, 8.6 (standard deviation 4.8) months post-surgery. Predictive factors for persistent CPAP dependency were age ≥ 50 years, preoperative AHI ≥ 30/hour, Excess Weight Loss (EWL) < 60% and hypertension (area under the curve: 0.772).

Conclusion: After bariatric surgery, around three-quarters of the moderate to severe OSA patients no longer required CPAP; whereas, a quarter (25.9%) remained CPAP dependent. Age ≥ 50 years, preoperative AHI ≥ 30/hour, EWL < 60% and hypertension were predictive factors for this persistent CPAP dependency.

Disclosure: Prof. de Vries is a member of the Medical Advisory Board of NightBalance and has shares in NightBalance. C.A.L. de Raaff, U.K. Coblijn, M.J.L. Ravestloot, ESM de Lange de Klerk and Dr. B.A. van Wagenveld declare that they have no conflict of interest.

OS9.05

Do pancreatobiliary secretions (pancreatic enzymes) influence glucose absorption after metabolic gut surgery?

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Background and Aims: Our previous results suggest that the presence of pancreatic enzymes in the gut may be involved in the improved glucose tolerance observed following metabolic surgeries (1). Gastrojejunal surgical rearrangements alter gut exposure to pancreatic enzymes and bile. We aimed to explore the absorption of glucose in the different segments of the reconstructed gut in a bariatric pig model.

Material and Methods: Two sets of experiments were run on 3 (29 ± 3 kg) and 5 (15 ± 2 kg) pigs. Duodenal-jejunal bypass surgery was done where a separated pancreatobiliary (PBC), an alimentary (AC), and a common channel (CC) were formed. A jugular blood catheter and intestinal ports for infusion were placed in the upper part of the PBC in all pigs. In the second set, ports were also placed in the upper part of AC and lower part of PBC, next to the anastomosis with CC. Glucose (1g/kg b.wt) was orally gavaged or infused as a bolus into the intestinal ports and blood was taken at 0, 5, 10, 15, 30, 45, 60 and 120 minutes thereafter.

Results: In the first set, glucose infusion to the PBC increased blood glucose from 4.5 ± 0.3 to 9.4 ± 0.1, and blood insulin from 3.9 ± 1.1 to 111 ± 43 pmol/L, while oral gavage only increased blood glucose from 5.0 ± 0.4 to 5.8 ± 1.0 mmol/L, with a slight increase in insulin from 5.7 ± 2.7 to 8.4 ± 4.6 pmol/L. In the second set, blood glucose increased from 4.1 ± 0.3 to 11 ± 2.2 mmol/L following infusion into the upper PBC (duodenum), and to 9.0 ± 1.0, 7.7 ± 2.1 and 6.8 ± 1.5 mmol/L after AC infusion, lower PBC infusion and oral gavage, respectively. Insulin increased to around 56 ± 3.9 pmol/L after upper PBC, AC and lower PBC infusions, but only to 33 ± 8.8 pmol/L after oral gavage.

Conclusion: Glucose absorption is higher in the separated PBC (duodenum) which is exposed to pancreatobiliary secretions (enzymes), compared to the other (AC and CC) segments following glucose infusion, or after oral glucose gavage. The results suggest that metabolic surgery may affect the ratio between absorption and enterocyte/gut bacterial consumption of glucose.

Reference:

1 Lozinska, L. et al. (2016) Decreased insulin secretion and glucose clearance in exocrine pancreas-insufficient pigs. *Exptl physiol*, 101(1):100–112.

Disclosure: No conflict of interest declared

OS9.06

Leptin, inflammation, oxidative and carbonyl stress may play a pivotal role in insulin-resistance in non-severely obese patients (BMI <35kg/m2) with type 2 diabetes mellitus

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Background and Aims: Leptin has been shown to induce inflammation, insulin-resistance and oxidative stress in obese patients. The role of these parameters have only been scarcely investigated in type 2 diabetes (T2DM) remission in non-severely obese patients (Body Mass Index <35kg/m²) after gastric bypass (RYGB).

Objectives: To investigate changes in leptin, cytokines, programming of circulating mononuclear cells and insulin-resistance in non-severely obese patients with high insulin-resistance and T2DM.

Material and Methods: Twenty patients with insulin-dependent T2DM and high insulin-resistance underwent RYGB in a prospective cohort study. Patients were followed-up for 24 months. Serum leptin, cytokines and insulin-resistance were measured. Gene expression of cytokines, NF-kappaB pathway as well as defense for reactive oxygen and carbonyl species of circulating blood mononuclear cells (PBMC) were measured using real-time polymerase chain reaction (rtPCR).

Results: After 24 months, 81% of the patients were off insulin therapy. Serum leptin levels dropped significantly within 3 months from 19.06 ± 3.5ng/ml to 9.3 ± 1.7ng/ml and kept decreasing to 5.8 ± 1.0ng/ml after 24 months (all p < 0.05). Similarly, insulin-resistance also improved significantly as well within 3 months and remained at low levels (all p < 0.05). Pro-inflammatory cytokines such as TNF-α and IL-1β significantly decreased postoperatively whereas the immunomodulatory cytokines IL-4 and IL-13 increased. In the PBMCs, expression of the pro-inflammatory genes TNF, IL1B, and VEGFA significantly decreased whereas IL10 increased. The expression of NFKB1 and RelA of the NF-kappaB pathway decreased as well. Additionally, the markers of cellular stress such as Heat Shock Protein 4 decreased within 3 months while the defense for reactive oxygen and carbonyl species (superoxidismutase and glyoxalase I) both were reduced as well. Lastly, cytochrome c oxidase I (mtCO1) as a measure for mitochondrial stress was also significantly improved 12 months after RYGB. The decrease in leptin tended to correlate with improvement in insulin-resistance (r=0.829; p = 0.05).

Conclusion: The association of decrease in leptin and insulin-resistance suggest a causal relationship. The role of leptin in non-severely obese patients with T2DM and its interaction with inflammation and oxidative stress requires further research.

Disclosure: No conflict of interest declared

OS9.07

More uniform gastric pouch emptying in female patients with successful weight loss after gastric bypass surgery compared to poor weight loss

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Background and Aims: Roux-en-Y Gastric Bypass (RYGB) surgery results in a total body weight loss (TBWL) of approximately 30%, or excess weight loss of about 70%. Weight loss (WL) differs among individuals and

ranges from <20% to >40% TBWL. WL depends on several factors, one might be passage time of food through the gastric pouch into the Roux-limb. Accelerated food exposure into the small intestine might affect the changes in the small intestine, e.g. gut hormone release, which may affect WL.

Objectives: The aim of this study is to identify gastric pouch emptying (GPE) of solids in female patients with successful weight loss (S-WL, TBWL>40%) and poor weight loss (P-WL, TBWL<25%).

Material and Methods: Ten matched female patients, five with P-WL and five with S-WL, were included 24 months after standard RYGB surgery. None had preoperative passage or motility problems. After an overnight fast, gastric emptying scintigraphy was performed. Dynamic imaging started after first ingestion of a Tc-99m-nanocolloid labeled pancake (10 MBq, ± 125 kcal). Eighty measures of a minute were performed. A region of interest around the gastric pouch was delineated to measure the half GPE time and the maximal slope of GPE over three minutes. Groups were compared using a student's T-test.

Results: The groups were comparable for age, preoperative weight and time after RYGB. The average TBWL two years after RYGB was 21% in the P-WL group and 45% in the S-WL group. Time to half did not differ between the groups (18 ± 8.2 [P-WL] and 21 ± 12 [S-WL] minutes). The maximal slope was significantly smaller in the S-WL group ($5 \pm 3\%$) compared to the P-WL group ($11 \pm 3\%$), $p = 0.01$.

Conclusion: These results suggest a more uniform gastric pouch emptying in patients with successful WL compared to patients with poor WL two years after RYGB. The gastrointestinal response after a fast food exposure rate into the small intestine may play a role in the poor WL. Also, dumping might occur which may result in overeating to compensate for the relative low blood glucose level.

Disclosure: No conflict of interest declared

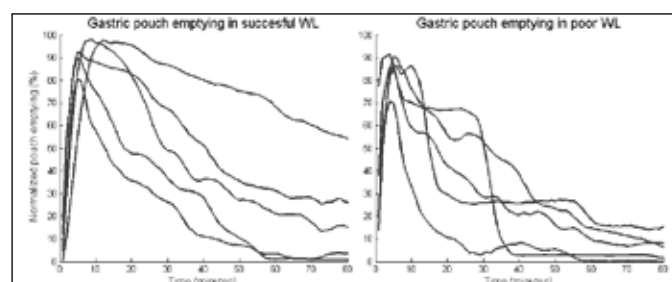


Fig. 1.

OS9.08

Appetite and taste changes following sleeve gastrectomy and Roux-en-Y gastric bypass: Influence of gender and type 2 diabetes and their relationship to weight-loss

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Background and Aims: Appetite and taste changes are reported following Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG). There are no data regarding the influence of gender or type 2 diabetes (T2D) upon these changes. We evaluated appetite, taste and smell changes post-RYGB and post-SG, the influence of gender and T2D and association with percent weight loss (%WL).

Material and Methods: Patients attending follow-up after primary SG or RYGB completed a validated appetite, taste and smell questionnaire¹. An-

thropometric and clinical data were collected. Analyses were performed using Mann-Whitney U tests, Chi Square tests and linear regression.

Results: 98 patients post-RYGB and 155 post-SG were included (Table 1). Most patients reported appetite and taste changes with no difference between RYGB and SG (Table 2). Smell changes were more common post-RYGB than post-SG. %WL was greater post-RYGB (RYGB=25.6 \pm 0.9%, SG=21.2 \pm 0.8% $p < 0.001$).

Gender or T2D had no effect on the prevalence of taste or smell changes, or %WL post-RYGB. However, in the SG-group taste and smell changes were less common in males compared to females (taste: females=65%, males=40% $p < 0.05$; smell: females=32%, males=14% $p < 0.05$). Post-SG, T2D patients had lower %WL compared to patients without T2D (17.7 ± 0.5 vs. 22.45 ± 1 ; $p < 0.05$). After correcting for sex, age, duration post-surgery and T2D, taste changes predicted %WL post-RYGB but not post-SG (3.6, 95% CI 0.7–7.1 age-adjusted model and 3.8, 95% CI 0.2–7.4 T2D-adjusted model, both $p < 0.05$), whereas appetite changes strongly predicted %WL post-SG (8.69, 95% CI 3.24–14.14 age-adjusted model and 8.93, 95% CI 3.38–14.48 T2D-adjusted model, both $p < 0.01$) but not post-RYGB.

Conclusion: Appetite and taste changes are common after RYGB and SG but changes in smell are more common post-RYGB. No effect of gender or T2D was observed in post-RYGB. Post-SG taste and smell changes were less common in males and %WL lower in T2D patients. Further studies are warranted to determine underlying biological mediators and aid individualising procedure choice.

Reference:

1 Graham L et al., *Obes Surg.* 2014;24(9):1463–1468.

Acknowledgement: Funded by the Rosetrees Trust and the National Institute for Health Research.

Disclosure: No conflict of interest declared

	Age (years)	BMI (kg/m ²)	Time post-surgery (days)	T2D
RYGB (n = 98)	46.5 \pm 1.1	44.7 \pm 0.7	769 \pm 53	53 (54%)
SG (n = 155)	44.3 \pm 1.0	46.1 \pm 0.6	593 \pm 43*	39 (26%)*

* $p < 0.05$

Fig. 1.

	RYGB	SG	P-value
Appetite	91%	91%	1
Taste	64%	59%	>0.05
Smell	41%	28%	<0.05
Food aversions	62%	59%	>0.05

Fig. 2.

OS10: IFSO-EC Session – Multidisciplinary approach / Bariatric and metabolic surgery in extremes of age

OS10.01

Mental health in adolescents 1 to 5 years after bariatric surgery – results from a Swedish nationwide study AMOS

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Background and Aims: Little is known about the long-term outcome in mental health in adolescents undergoing bariatric surgery. Research in adults suggest that improvements in mental health are sustained at least 6 years after bariatric surgery but other studies show that improvements start to erode after the first year post-surgery. We have previously shown that mental health is substantially improved in adolescents 1 year after gastric bypass.

Objectives: Evaluate mental health in adolescents from 1 to 5 years after gastric bypass.

Material and Methods: Subjects were 63 operated adolescents (67% girls, mean age at surgery: 16.9) from the AMOS-cohort. Symptoms of depression and anxiety were assessed with BDI-II and BAI at 1 and 5 years after gastric bypass. Youth specific questionnaires, BYI, were used at baseline.

Results: Highly elevated symptoms of depression and anxiety were reported by 24% and 19% at baseline. No significant changes were seen in depression ($p = 0.752$) or anxiety ($p = 0.354$) in operated adolescents from 1 year to 5 years after surgery. Operated girls reported more symptoms of depression ($p = 0.032$) and anxiety ($p = 0.038$) 5 years after surgery than operated boys. Five years after surgery 27% of the adolescents reported depressive symptoms in the clinical range and 13% reported severe depressive symptoms. Suicidal ideation was reported by 16% 5 years post-surgery, 10% reported passive and 6% reported active suicidal ideation. Severe symptoms of anxiety were reported in 13% of the adolescents.

Conclusion: In adolescents undergoing gastric bypass surgery mental health was stable from 1 year post-surgery to 5-year follow-up, indicating no decline in mental health after the first post-surgical year. As in population studies girls reported more symptoms of depression and anxiety than boys. Clinical depression was more common in operated adolescents (27%) than expected from population studies (5–8%). Long term continued follow-up of mental health is mandatory in adolescents since a substantial group report sustained clinical depressive symptoms and suicidal ideation.

Disclosure: No conflict of interest declared

OS10.02

Identifying of significant Obstructive Sleep Apnoea in the Obese Patient: Development of the DX-OSA Score and the aOSA-obese Score

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Background and Aims: Obstructive sleep apnea (OSA) is frequently undiagnosed in the morbidly obese which require anaesthesia. Preoperative CPAP may reduce the likelihood of cardio-respiratory complications.

The aim of this study was to identify to what extent anthropometric measurements can be used to predict the presence of significant OSA which requires CPAP, defined as an Apnoea / Hypopnoea Index of 20 or greater.

Material and Methods: With institutional Ethics Committee approval and signed informed consent we prospectively studied 1357 consecutive patients who were scheduled for laparoscopic bariatric surgery in our center, between January 2013 –December 2015.

All the patients were assessed before surgery recording BMI, gender, diabetes, neck circumference, STOP BANG, SpO₂. We measured neck fat, trunk fat, using Dual X-ray Absorptiometry that allows the differentiation between bone and the soft tissue subdivided into fat and lean compartments.

We performed the anthropometric measurements of the patients (A Body Shape Index, Waist Hip Ratio).

The patients with a STOP BANG score >4 were investigated with Polysomnography at home.

Results: 226(16,5%) patients received CPAP preoperatively.

The cut-off points for each parameter of interest were determined using de Youden Index and Matthew's Correlation Coefficient. The statistical analysis was performed with SPSS version 22.

After examining the area under curve's and cutoff points for each variable we then constructed two new scores :the DX-OSA and an anthropometric OSA score = aOSA-obese Score – attachment

The DX-OSA score and the aOSA- obese score >= 3 are good predictors of moderate severe OSA which requires preoperative CPAP treatment

Conclusion: The gold standard for OSA diagnostic, Polysomnography, is difficult to perform reliably.

The CPAP pressure can be initiated without in laboratory pressure titration by the auto-titrated CPAP = APAP .Use of these measurements as part of the DX-OSA and aOSA-obese Scores appears to show great promise that they could replace the need for formal Polysomnography in a large proportion of Bariatric patients.

Disclosure: No conflict of interest declared

Cutoff values for different parameters in OSA diagnosis						
Variable(s)	AUC	Std. Error ^a	Cutoff value	p value ^b	Sensitivity	Specificity
BMI	.809	.029	43.80	.000	.832	.715
Lean Weight (kg)	.735	.033	62.40	.000	.754	.660
Actual Weight (kg)	.816	.028	134.60	.000	.769	.764
Fat Mass (kg)	.778	.030	66.08	.000	.715	.764
Trunk Fat (kg)	.809	.029	39.22	.000	.769	.805
Neck Circumference (cm)	.826	.027	44.50	.000	.839	.661
Neck Fat (g)	.837	.025	1329.50	.000	.741	.870
ABSI	.632	.036	.085	.000	.482	.771
WHR	.705	.034	.90	.000	.927	.383
SpO ₂	.777	.031	.95	.000	.769	.715
Stop Bang Score	.846	.026	4.50	.000	.825	.691
Expiratory reserve volume(L)	.661	.079	.55	.050	.480	.870
DX-OSA Score	.902	.021	3.00	.000	.854	.838
aOSA-obese Score	.856	.020	3.00	.000	.800	.879

Fig. 1.

The DX-OSA Score		
	Cut off	Points
STOP-BANG	≥4	1
BMI (Kg/m ²)	≥43	1
Baseline SpO ₂	≤95	1
Neck Fat(g)	≥1.33	1
Trunk Fat(g)	≥99.35	1
Expiratory Reserve Volume	≤0.55	1

The aOSA-obese Score		
	Cut off	Points
STOP-BANG	≥4	1
BMI	≥43	1
Baseline SpO ₂	≤95	1
Neck Circumference(cm)	≥43	1
WHR	≥0.9	1
Expiratory Reserve Volume	≤0.55	1

Fig. 2.

OS10.03

Intraperitoneal ropivacaine irrigation in patients undergoing bariatric surgery: A prospective randomized clinical trial

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Background and Aims: Despite most bariatric procedures are actually performed by laparoscopic approach, management of postoperative pain remains a major challenge. The aim of this study was to analyze the analgesic effect of intraperitoneal ropivacaine infusion in patients undergoing bariatric surgery.

Material and Methods: A prospective randomized clinical trial of all the patients undergoing laparoscopic sleeve gastrectomy (LSG) or laparoscopic Roux-en-Y gastric bypass (LRYGB) between January and November 2015 was performed. Patients were randomized to experimental (EG:those patients undergoing intraperitoneal ropivacaine irrigation) and control groups (CG:those undergoing intraperitoneal irrigation with normal saline).

Results: 110 patients were included, 83 LRYGB(75.5%) and 27 LSG(24.5%). Mean pain, as measured by VAS score, was 21.7±14.5 mm in CG and 13.3 ± 10.9 mm in EG (p = 0.002). Morphine needs during the first 24 hours postoperatively were 21.8% in CG and 3.6% in EG (p = 0.01). Early taking of fluids by mouth was possible 6 hours after surgery in 76.4% in EG vs 34.5% in CG (p = 0.001). Early mobilization ability (6 hours after surgery) was feasible in 72.7% in EG and 32.7% in CG (p = 0.001). Median hospital stay was 3 days (range 2–10 days) in CG and 2 days (2–7 days) in EG (p = 0.009).

Conclusion: The intraoperative peritoneal infusion with ropivacaine in patients undergoing bariatric surgery is associated with a reduction in postoperative pain, lower morphine needs, earlier mobilization and earlier oral intake of fluids after surgery, and a shorter hospital stay.

Disclosure: No conflict of interest declared

OS10.04

Helicobacter pylori eradication prior bariatric/metabolic surgery

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Background and Aims: Data are highly positive that infection with H. pylori has an association with postoperative complications in all type of bariatric surgery procedures. Current guidelines are not uniform for the management of H. pylori infection in obese patients who are candidates for bariatric surgery, and the need for H. pylori screening and eradication before surgery is still debated.

Objectives: Obesity is an increasing health problem. The prevalence of Helicobacter pylori infection is decreasing in population but our data suggest it is high in the group of candidates for bariatric surgery. Recent studies suggested colonization of the stomach by H pylori might affect gastric expression of appetite- and satiety-related hormone and patients cured of H pylori infection gained weight. H. pylori infection plays a special role in obesity for two main reasons: (1) its possible relationship with body mass index (BMI); and (2) it is a negative factor in limiting access to bariatric surgery. H. pylori is an ancient colonizer of the human stomach and represents the main etiological factor in the development of gastritis, peptic ulcer and gastric malignant lesions and should be treated before any surgical intervention.

Material and Methods: Upper endoscopy is used prior surgery in all series of metabolic/bariatric interventions in our institution. 96 patients of average BMI 46 kg/m² (84 female and 12 male) underwent upper endoscopy prior bariatric/metabolic surgery. Routine gastric biopsy for HUT (quick urease test, sensitivity 65%) was performed in all patients and positive and all positive samples were microbiologically identified (culture); histology for additional mucosal biopsy was performed (100% sensitivity). Routine repeated upper endoscopy was performed in all H. pylori positive patients after 1 month free interval of standard 7d treatment protocol according to local sensitivity to H. pylori. A combination of esomeprazole, amoxicillin and metronidazole treatment regimen was used with average elevation dose of 30%. Antibiotic dosage correction to BMI was used.

Results: HUT test was positive in 63% of patients in 10 minutes period and in 66% in 24 hours period. Histology was positive in 76% of patients (73 patients). Repeated upper endoscopy and same diagnostic protocol revealed 92% H.pylori eradication rate; after antibiotic dosage correction to BMI eradication rate was 100%. In 2 of 96 patients (2,1%) H.pylori repeated EGDS negative patients late postoperative surgical complications were observed (1 sleeve gastrectomy leak and 1 marginal ulcer perforation); 8 of 96 patients (8, 3%) late moderate anemia was present despite feral supplementation. Excellent EWL % (average 50 kg, representing 88% of EWL) was obtained in 1 year period and no other postoperative complications.

Conclusion: Our data strongly support routine upper endoscopy studies with routine H. pylori screening and biopsies, evaluation of pathological abnormalities (e.g., esophagitis, polyps, hiatal hernia, gastritis, and duodenitis) in patients candidates for bariatric/metabolic surgery to reduce early postoperative and long term surgical and nonsurgical complications. Data suggest highly sensitive methods (histology and H. pylori sensitivity test) for H. pylori identification and repeated EGDS in positive patients prior any surgical intervention. Antibiotic dose correction to BMI and a combination regimen of esomeprazole with antibiotic mono/bivalent therapy according to guidelines was more effective and reduced postoperative complications according to data available in the literature.

Disclosure: No conflict of interest declared

Assessment of social relationships among bariatric surgery patients and their association with pre-surgery body mass index and post-operative weight loss

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Background and Aims: Bariatric surgery is the most effective weight-loss treatment for patients with severe obesity, however post-surgery weight-loss is variable. Social support and being single are suggested to impact positively upon post-surgical weight-loss¹. However, the majority of studies have been retrospective and have examined limited aspects of social relationships such as support group attendance or marital status¹. We aimed to undertake a comprehensive assessment of social relationships pre-operatively and to examine how these impacted upon weight-loss post-surgery.

Material and Methods: 188 patients (scheduled to undergo primary sleeve gastrectomy or Roux-en-Y gastric bypass) completed a questionnaire assessing employment status, education level, self-esteem, received and provided social support, marital status and satisfaction and social engagement. Anthropometric data were collected at time of questionnaire completion, day of surgery, 4, 12 and 24 weeks post-surgery. Descriptive statistics and one-way ANOVA tests were conducted using STATA 13.

Results: Mean pre-surgery body mass index (BMI) was 46.5 ± 0.58 kg/m² and decreased to 41.4 ± 0.63 kg/m² at 4 weeks, and 38.5 ± 0.62 kg/m² at 12 weeks post-surgery. 56.5% of patients were married, 25.8% single, 17.7% divorced/separated or widowed. 70.2% of all patients reported being very satisfied with their closest person and, 69.5% of married patients reported highest marital satisfaction. Median score for emotional support was 25 (out of 28). 75.3% of patients had high or normal self-esteem. 61.8% reported having acquaintances, friends and relatives who had bariatric surgery. Only 7% reported seeing no friends per typical month. Pre-surgery BMI was negatively associated with marital and closest person satisfaction ($p = 0.02$ and $p < 0.01$) and positively with the number of friends seen per month ($p = 0.04$). Date of surgery BMI was negatively associated with self-esteem, $p = 0.01$. The associations with post-surgery weight-loss will be also presented.

Conclusion: Bariatric surgery patients resemble the general population in terms of their social relationships. Under <10% appear socially isolated. Social relationships impact pre-operative BMI status and their association with weight-loss will be investigated next.

Reference:

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Disclosure: No conflict of interest declared

Micronutrient status after laparoscopic sleeve gastrectomy

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Background and Aims: Laparoscopic Sleeve Gastrectomy (LSG) has become popular in recent years, however there is a paucity of research exploring the micronutrient-status following the operation. We aim to

explore the micronutrient-status prior to, and two and five years after the operation.

Objectives: To describe and evaluate data on micronutrient and micronutrient-supplement following LSG.

Material and Methods: Patients were operated from May 2007 until April 2014. Gastric resection was performed along a 32 Fr tube from the pylorus to the cardia. Data reviewed included age, sex, weight, body mass index (BMI) and micronutrient supplement. Serum values of interest were 25(OH) vitamin D, parathyroid hormone, ferritin, haemoglobin, folate and vitamin B12.

Results: A total of 336 patients were operated. The mean BMI was 45.3, mean age 41 years and 71% were females. Pre-operative 10% were taking multivitamin and 4% cobalamin supplement, less than 2% used other supplements. The patients mean 25 (OH) D, folate and cobalamin values were below the reference range in 20, 8.8 and 12% respectively.

Post-operative, patients were recommended to take one multivitamin daily. We have follow-up data for 267 patients at 24 months and 107 patients at 60 months. Between two and five years' multivitamin supplementation dropped from 70 to 54%. Percentage of patients using other supplements at two and five years were 20–30% for cobalamin, 8–12% for folate and 8–12% for iron respectively.

Patients 25(OH)D values were significantly improved at two years and remained stable thereafter, while the ferritin level decreased over time. At five years, the serum value of all micronutrients evaluated was normal in $\geq 90\%$ of the patients, but the serum ferritin level was below reference value in 36% of the patients.

Conclusion: About half of the patients used a multivitamin supplement regularly five years' post-surgery, but additional individual micronutrient supplements were used. Most patients had normal values for haemoglobin, cobalamin, folate and vitamin-D five years post-LSG.

Acknowledgement: We acknowledge Ronny Gåsdaal, Eli Natvik and Lisbeth Schjeldrup for collecting data.

Disclosure: No conflict of interest declared

Table 3. Proportion of patients (%) with important biochemical variables below or above reference value prior to and at 12, 24 and 60 months after laparoscopic sleeve gastrectomy

	Normal values		preoperative	12 months	24 months	60 months
25 (OH)D (nmol/L) 30–150		%	n 270	n 288	n 219	n 90
		deficient	29.4	4.9	8.2	6.7
		normal	70.6	94.8	91.8	93.3
		excess	0.7	0.3	-	-
Ferritin (ng/L) 15–120			n 334	n 301	n 230	n 94
		deficient	3.3	11.6	20	36.2
		normal	60.5	55.8	57	57.4
		excess	36.2	32.6	23	6.4
Folate (nmol/L) >6			n 328	n 308	n 236	n 94
		deficient	8.8	12.3	7.6	10.6
		normal	91.2	87.7	92.2	89.4
		excess	-	-	-	-
Haemoglobin (g/dl) 11.5–16			n 336	n 308	n 242	n 97
		deficient	2.4	3.6	3.7	5.2
		normal	97.6	96.2	96.7	94.8
		excess	3.9	4.2	4.5	2.1
Cobalamin (pmol/L) 200–800			n 330	n 240	n 240	n 95
		deficient	12.1	30.6	24.2	7.4
		normal	87.9	69.1	72.1	88.2
		excess	1.5	3.2	3.8	8.4

Results are expressed as percent (%). 25(OH)D = 25 hydroxyvitamin D

Normal, deficient and excess levels are values based on analyses by the department of Clinical Biochemistry at Førde Central Hospital (except for 25(OH)D: Hordaland University Hospital)

Fig. 1.

Bariatric surgery improves quality of life and maintains nutritional status of older obese patients

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Background and Aims: Bariatric surgery is being safely performed in older patients. Quality of life and aggravation of sarcopenic obesity, however, have never been assessed in this subgroup of patients.

Objectives: This retrospective study aims to evaluate quality of life of older obese patients after surgery and to compare variations of their nutritional parameters to those of younger patients.

Material and Methods: Seventy-nine patients older than 60 years (Group 1) were matched 1:2 with 158 patients younger than 50 years (Group 2) for comparison of nutritional parameters. A modified Impact of Weight on Quality Of Life (IWQOL) questionnaire was filled by all included patients, at the one-year check-up.

Results: The preoperative serum albumin and prealbumin levels were comparable between the two groups. Albumin values regained preoperative levels at six months in both groups intergroup comparison showed no significant difference. The serum prealbumin levels reached back the preoperative values at 12 and 6 months in Groups 1 and 2, respectively. Values were significantly lower in Group 1 comparatively to Group 2 at three and six months (0.18 versus 0.19; $p = 0.04$ and 0.20 versus 0.21; $p = 0.03$, respectively) but not at one year. Sixty-nine patients (87.3%) gave a total of 1860 answers in the modified IWQOL. Among them, 181 (9.7%) and 1422 (76.5%) were in favour of mild and marked improvements, respectively.

Conclusion: Bariatric surgery improves quality of life of older obese patients with no compromise of their nutritional status. In the lack of precise recommendations, this represents a major argument that may serve to the preoperative assessment of such patients.

Disclosure: No conflict of interest declared

OS10.08

Sleeve gastrectomy in teenagers: Multi-institutional experience on syndromic and not syndromic patients

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Background and Aims: Childhood obesity represents a serious high-volume health problem¹⁻³. In the last years, bariatric surgery had show excellent results, gaining worldwide success^{4,5}. The treatment in teenagers affected by congenital syndrome, represent a controversial issue⁶⁻⁷. The aim of this study was to evaluate the effects of sleeve gastrectomy (LSG) in teenagers affected by morbid obesity, with or without congenital syndromes

Objectives: Evaluation of effect on weight loss and comorbidities resolution comparing the results between two different categories of patients

Material and Methods: 34 obese (BMI 40–69 Kg/m²) teenagers, age 13–19 years, affected by severe comorbidities (100%) submitted to LSG, were retrospectively evaluated, analyzing complications rate, %EWL, and comorbidities control. At 1 year follow-up 2 groups were matched, patients affected by syndromic obesity (SPg) vs no-syndromic (nSPg), to investigate the final outcomes.

Results: All the operations were completed laparoscopically and no intra-operative complications were recorded. Mortality was nil and peri/post-operative complications did occur in two patients (5.8%–Clavien Dindo score II/IIIb). The post-operative EWL% was 16.8, 29.2, 37.5, 42.8, 64.2, 62.3, 61.5 (11/34 pts–32%) at 1,3,6,9,12,18 and 24 months. Comorbidities resolution rate was 78.2% and the improvement rate was 56.3%. At one-year follow-up, the SPg (7 patients, mean age of 16.4 ± 2.7 years, mean pre-operative BMI of 47.3 ± 5.6 Kg/m²) and the nSPg (7 patients, mean age of 15.1 ± 2.4 years, mean pre-operative BMI of 48.4 ± 5.4 kg/m²) didn't shows significant difference, set at $P < 0.05$, for each variable.

Conclusion: LSG is advantageous in the treatment of teenager morbid obese patients in terms of safety, weight loss and comorbidities control offering, at same time, a great option in patients affected by congenital syndrome

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Saturday, 4 June, 2016

OS13: IFSO–EC Session – Abstract Prize (voting session)

OS13.01

Long-Term Effects of Roux-en-Y Gastric Bypass on Type 2 Diabetes Mellitus in Patients with Morbid Obesity

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Background and Aims: Obesity together with type 2 diabetes (T2DM) is associated with increased prevalence of cardiovascular disease and early death. The aim of this study was to assess the resolution of T2DM in a large cohort of morbid obese patients over a long-term period.

Material and Methods: 3795 patients with obesity underwent gastric bypass in our department from 2005–2013. Registration and follow-up was done in a prospective database. T2DM was defined according to the IDF Consensus from 2009.

Results: Preoperative mean age was 41 years, 79% of the patients were females and mean BMI was 41.1 kg/m². Of 3795 patients 27.5% (1045) had impaired glucose metabolism; 15.4% (583) were on treatment for T2DM and 12.2% (462) had IGT. T2DM occurred more frequently in males, at high age, high BMI, and high waist circumference. Patients with T2DM on medical treatment for less than 5 years had mean baseline glycated haemoglobin levels (HbA1c) of 6.99±1.61 significantly lower than 8.62±1.47 in those treated for more than 10 years.

Follow-up after 5–9 years in patients with impaired glucose metabolism was 89% (378/424). Complete remission of T2DM occurred in 78%. Patients with T2DM had EBMIL of 71.6%, significantly lower than 75.6% in patients with normal glucose metabolism or with IGT ($p < 0.001$). T2DM did not influence complication rates and neither affected number of hospitalized days.

Conclusion: Despite medical treatment T2DM is a progressive disease. Gastric bypass surgery in obese patients is associated with complete remission of T2DM in 78% of patients after 5–9 years and is safe and durable intervention in T2DM patients with morbid obesity. Patients with IGT

have a better weight loss after surgery compared to those with T2DM, suggesting that early bariatric surgery should be considered in patients with obesity and concurrent IGT or T2DM.

Disclosure: No conflict of interest declared

OS13.02

Bleeding during laparoscopic gastric bypass as a risk factor for postoperative complications. A cohort study from the Scandinavian Obesity Surgery Registry.

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Background and Aims: Intraoperative adverse events are associated with increased risk for postoperative complications, however, little is known whether the amount of bleeding during laparoscopic gastric bypass surgery affects the outcome.

Objectives: The objectives were to test if increased bleeding during the operation is associated with increased risk for postoperative complications and to identify patient-specific risk factors for intraoperative bleeding.

Material and Methods: From the Scandinavian Obesity Surgery Registry we identified 43,157 individuals operated with laparoscopic gastric bypass surgery from January 8, 2007 until September 15, 2015, and with an estimated amount of bleeding during the operation. The amount of intraoperative bleeding was compared with data from follow-up at day 30, 1 year and 2 years after surgery. Obesity-related co-morbid diseases, pre-operative weight-loss, age and BMI were analysed against intraoperative bleeding of >100 mL.

Results: A blood loss of more than 100 mL during the operation was associated with an increased risk for postoperative complications at 30 days (0–99 mL incidence 7.8%; 100–499 mL incidence 19.2%, $p < 0.001$; 500–1500 mL, incidence 21.5%, $p < 0.001$; >1500 mL incidence 26.7%, $p = 0.013$), 31 days–1 year (0–99 mL incidence 5.9%; 100–499 mL incidence 8.9%, $p < 0.001$; 500–1500 mL, incidence 10.7%, $p = 0.083$; >1500 mL incidence 18.2%, $p = 0.104$), and 1–2 years (0–99 mL incidence 7.7%; 100–499 mL incidence 10.5%, $p = 0.006$; 500–1500 mL, incidence 11.3%, $p = 0.290$; >1500 mL incidence 36.4%, $p = 0.002$) after surgery.

Diabetes (OR 1.35, 95% CI 1.10–1.65, adjusted- $p = 0.004$), sleepapnea (OR 1.29, 95% CI 1.04–1.59, adjusted- $p = 0.018$), age (OR 1.02, 95% CI 1.02–1.03, adjusted- $p < 0.001$), and BMI (OR 1.02, 95% CI 1.01–1.03, adjusted- $p = 0.006$) were patient-specific risk factors for intraoperative bleeding >100 mL, whereas preoperative weight-loss was associated with a lower risk for bleeding (OR 0.42, 95% CI 0.34–0.53, adjusted- $p < 0.001$).

Conclusion: Intraoperative bleeding is associated with increased risk for early as well as late postoperative complications after laparoscopic gastric bypass surgery. Diabetes, sleepapnea, age and BMI are associated with increased risk for intraoperative bleeding, whereas pre-operative weight-loss seem to be protective.

Disclosure: No conflict of interest declared

OS13.03

Reduction of Short-term Morbidity in the Standardized Fully Stapled Laparoscopic Roux-en-Y Gastric Bypass: A Single Centre Study on 10 000 Patients

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Background and Aims: The Roux-en-Y gastric bypass is considered as the golden standard bariatric surgical procedure. Our standardized technique of the fully stapled laparoscopic RNY gastric bypass (FS-LRYGB) was previously described and has shown a low mortality and morbidity.

Small surgical and anesthesiological improvements have been implemented over the years and some complications like bleeding and leaks might be further reduced.

Objectives: The primary objective is to analyze the short term major surgical complications on 10 000 patients. Secondly, the reduction in total complications, in leaks and in bleeding over time were analyzed. Thirdly, possible risk factors for bleeding complication were analyzed.

Material and Methods: We counted all complications of a prospectively kept database on 10 000 laparoscopic RNY gastric bypasses performed between April 2004 and May 2015. Patients were split in 5 cohorts and total number and type of complications were analyzed. A multivariate logistic regression was used to identify the risk factors for bleeding.

Results: There was a successful 30 day follow-up in 98.6% ($n = 9855$). Two patients died within 30 days after surgery (0.02%). In 195 patients there was a severe surgical related complication (1.98%), which needed a surgical revision in 80 patients (0.81%). Anastomotic leakage occurred in 7 patients (0.07%); iatrogenic bowel perforation with need for reoperation occurred in 2 (0.02%). In 156 patients there was postoperative bleeding (1.58%), which needed surgical re-intervention in 43 patients (0.44%). Lateral entrapment of the small bowel occurred in 12 patients (0.12%), and was surgical corrected in all. In 13 patients a re-intervention was performed for other reasons (0.13%). There is a significant decrease in complications, bleedings and in surgical re-interventions for bleeding. Male gender, older age and earlier year of operation was a significant risk factor for bleeding. Hypertension, diabetes, BMI and secondary (conversal) RNY surgery did not increase the risk for bleeding.

Conclusion: This study on 10000 FS-LRYGB confirms that complete standardization and gradual implementation of surgical and anesthesiological improvements can further diminish the complication rate, particularly the risk of bleeding.

Disclosure: No conflict of interest declared

	10000	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Spearman correlation coefficient	P-value
Severe surgical complications	192	78	55	27	21	16	-1.000	<0.001
Death	2	1	1	0	0	0	-0.866	0.058
Bleeding complication	156	61	48	21	18	13	-1.000	<0.001
Intraoperative bleeding	101	37	25	15	12	12	-0.975	0.005
Extracutaneous bleeding	38	27	18	8	8	1	-0.975	0.008
Revision for bleeding	43	21	11	2	8	1	-0.900	0.037
Laparotomy for bleeding	41	19	11	2	8	1	-0.900	0.037
Laparotomy for leakage	8	4	0	0	0	0	-0.707	0.182
Esophagogastric anastomosis	26	1	5	7	6	9	-0.900	0.037
Blood transfusion	151	52	38	20	16	7	-1.000	<0.001
Leakage complication	7	5	1	1	0	0	-0.948	0.014
Laparotomy for leakage	5	3	1	1	0	0	-0.948	0.014
Laparotomy for leakage	2	2	0	0	0	0	-0.707	0.182
Iatrogenic bowel perforation	2	1	0	0	0	1	0.000	1.000
Laparotomy for lateral entrapment	12	4	5	2	0	1	-0.800	0.104
Revision for other reason	13	1	5	3	3	1	-0.158	0.800

Fig. 1.

OS13.04

Early effects on glycemic control in Sleeve Gastrectomy and Roux-en-Y Gastric Bypass patients with type-2 diabetes

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Background and Aims: Roux-en-Y gastric bypass (RYGB) has rapid, non-weight dependent effects on glycemic control in obese type-2 diabetes (T2D) patients, while the effects of sleeve gastrectomy (SG) are less well characterized. We aimed to compare early glycemic control in obese T2D-patients undergoing RYGB or SG.

Material and Methods: Eighteen RYGB and 13 SG patients were recruited at Sahlgrenska and Ersta Hospitals in Sweden. No preoperative diet was prescribed. Glucose, insulin and GLP-1 were measured 0–180 min after 30 g oral glucose, 3 weeks pre-operatively, 2 days and 3 weeks post-operatively.

Results: Pre-operative insulin and glucose responses were blunted and did not differ between the groups. Already two days post-surgery, both groups displayed earlier and more distinct insulin peaks, but only SG patients displayed significantly increased peak height (mean±SEM; Pre- vs. three weeks post-op; SG: 32.6 ± 8.0 vs. 44.8 ± 8.8 mIU/L, $P < 0.05$; RYGB: 30.8 ± 4.4 vs. 36.8 ± 9.1 mIU/L, respectively, $P = 0.63$). Notably, the SG patients also displayed decreased fasting blood glucose levels already two days post-op (Pre- vs two days post-op: 8.2 ± 0.4 vs. 7.3 ± 0.3 mmol/L, respectively, $P < 0.05$), which was not seen in the RYGB patients (8.1 ± 0.5 vs. 7.8 ± 0.5 mIU/mL, respectively, $P = 0.56$). Three weeks postop, both groups displayed decreased fasting blood glucose levels ($P < 0.01$). Two-day post-operative fasting insulin levels were significantly decreased in RYGB, but not in SG patients (Pre- vs. post-op; RYGB: 26.6 ± 4.4 vs. 13.7 ± 1.6 mIU/L, respectively, $P < 0.01$; SG: 23.8 ± 5.5 vs. 15.8 ± 1.5 mIU/L, respectively, $P = 0.08$). At three weeks, fasting insulin levels were significantly decreased in both groups ($P < 0.01$). AUC for GLP-1 after oral glucose at three weeks was significantly higher in RYGB compared to SG patients (7525 ± 1258 vs. 4779 ± 712 pmol x min, respectively, $P < 0.05$).

Conclusion: Both RYGB and SG patients displayed early postoperative, non-weight dependent effects on glycemic control. The mechanisms may however be different, with SG patients displaying a more pronounced early insulin response to oral glucose, as well as an earlier decrease of fasting plasma glucose. These differences cannot be explained by GLP-1 levels that were higher in RYGB patients.

Disclosure: No conflict of interest declared

OS13.05

Resting energy expenditure after Roux-en Y gastric bypass surgery

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Background and Aims: The mechanisms by which Roux-en Y gastric bypass surgery (RYGB) provokes weight loss are incompletely understood. Enhanced energy expenditure may be one contributing mechanism. Previous results on changes in resting energy expenditure (REE) after RYGB are inconsistent. The aim of this study was to therefore to assess changes in REE in a large sample of severely obese subjects one year after RYGB.

Objectives: To assess changes in REE after RYGB and whether REE predicts weight loss (percentage weight loss, %WL).

Material and Methods: REE was measured by indirect calorimetry (mREE) before and one year after RYGB in 233 patients with severe obesity (175 women; all BMI ≥ 35.0 kg·m⁻²) and mREE was compared to predicted REE (pREE) and expressed as percentage of pREE (%pREE). For calculation of pREE, two new equations were developed from an independent reference group of non-operated subjects (852 subjects; BMI-range: 27.4–73.0 kg·m⁻²) that were examined in exactly the same setting as the bariatric patients that were followed up after RYGB. The new equations were based on either anthropometric (pREE-BM, %pREE-BM) or body composition (pREE-BC; %pREE-BC) parameters.

Results: After RYGB, absolute mREE was reduced by $20.4 \pm 11.0\%$ (-458 ± 277 kcal·d⁻¹; $p < 0.001$). Compared to pREE-BM (post-%REE-BM) and pREE-BC (post-%REE-BC), mREE was $2.3 \pm 9.4\%$ and $1.6 \pm 9.5\%$, respectively, higher (both $p \leq 0.03$). Post-%pREE-BM and post-%pREE-BC

after RYGB were positively correlated with %WL ($r=0.206$ and $r=0.231$; both $p \leq 0.003$).

Conclusion: Data indicate a slightly higher than predicted REE after RYGB suggesting an inherent effect of the surgery on energy metabolism which might play a role for weight loss outcomes.

Disclosure: No conflict of interest declared

OS13.06

Antrum preservation seems to accelerate gastric emptying after laparoscopic sleeve gastrectomy without having effects on weight loss.

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Background and Aims: The laparoscopic sleeve gastrectomy (LSG) involves a major gastric resection which could be associated with a motor dysfunction due to the resection of the gastric pacemaker, probably affecting the gastric emptying and likely to play an important role on weight loss outcomes.

Objectives: The purpose of this prospective study is to assess if LSG with or without antrum preservation (initial firing at 2 cm or at 5 cm from pylorus) induces changes in gastric emptying by using gastric scintigraphy and also to compare those results with the antrum volume (measured by MDCT Scan) and weight loss outcomes.

Material and Methods: For this prospective randomized study, 30 patients undergoing LSG were randomized into two groups: Group A (14 patients with initial firing at 2 cm from pylorus) and Group B (16 patients with initial firing at 5 cm). Gastric emptying scintigraphy (at 60 minutes post ingestion) was performed before, 2 months and 1 year after LSG. MDCT Scan was also performed before, 2 months and 1 year after surgery. Antrum volume was considered from a line from incisura angularis to the distal staple, up to the pylorus. The percent of excess weight loss (EWL%) was calculated after one year follow-up.

Results: Preoperative mean gastric emptying was 59% in Group A and 55% in Group B, with no statistical differences. Two months after surgery mean gastric emptying was 66% in Group A and 73% in Group B. Gastric antrum volumes were 11.8ml in Group A and 21.1ml in Group B ($p = 0.030$). Significant differences were found only in gastric emptying pre and 2 months after surgery in Group B ($p = 0.018$). At one year, mean gastric emptying was 69% in Group A and 73% in Group B. Antrum volumes were 11.2ml in Group A and 31.3ml in Group B. Mean %EWL at 1 year was 56.4% in Group A and 58.9% in Group B, without statistical differences.

Conclusion: An accelerated gastric emptying was found after LSG with antrum preservation but without correlation with weight loss in this group of patients.

Disclosure: No conflict of interest declared

OS13.07

Five-year results after Vertical Sleeve Gastrectomy (VSG) for severe obesity

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POSTERS

PO3 – Bariatric and metabolic treatment approaches

PO3.001

Long-term outcome of sleeve gastrectomy surgery on weight loss and glycemic control in a Middle Eastern military hospital [no Abstract]

PO3.002

Sleeve Gastrectomy: Our First 100 patients

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Background and Aims: Laparoscopic sleeve gastrectomy is becoming a popular procedure for the morbidly obese patient. Its utilization as a standalone procedure has good results with weight loss in short and mid-term reports. The aim of this study was to assess our technique and whether it warranted any modifications in the early postoperative period.

Objectives: To analyze the efficacy of sleeve gastrectomy as a stand alone bariatric procedure in correcting obesity and the co-morbidities and the safety of our technique.

Material and Methods: Our first 100 consecutive patients undergoing laparoscopic sleeve gastrectomy were retrospectively reviewed. Data analysis was done at 3 and 6 months to assess the percentage of excess body weight loss and comorbidity status change.

Results: The percentage of excess body weight loss at the 3 and 6 month marks was 30.7% and 49.6% respectively. Co-morbidities were also improved at the 3 and 6 month marks. Hypertension resolved in 39.5%, dyslipidemia resolved 22.8%, and diabetes in 47.5%. Complications during the first 6 months was 5%. Major complications included 1 patient with postoperative bleeding, 1 patient with proximal leak.

Conclusion: Our technique is a safe method that is easily reproducible. Laparoscopic sleeve gastrectomy is an excellent surgical option with a low complication rate.

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Disclosure: No conflict of interest declared

PO3.003

Metabolic outcomes of Sleeve Gastrectomy in Type 2 Diabetic obese patients

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Background and Aims: Bariatric surgery has proven to be the most effective treatment for type 2 Diabetes Mellitus (T2DM) in obese patients compared to medical treatment. Laparoscopic Sleeve gastrectomy (LSG) is currently accepted as a safe and effective procedure for this purpose. We analyzed our results in T2DM patients after LSG.

Objectives: To describe our outcomes in T2DM patients submitted to LSG after 24 months of follow up.

Material and Methods: Retrospective analysis of a series of obese T2DM patients who underwent LSG consecutively between 2006 and 2013. We registered excess of BMI loss percentage (%EBL), preoperative and post-operative fasting glucose and HbA1C levels, diabetes medication requirement, total morbidity and mortality.

Results: 112 patients (75 males and 37 females), mean age 50(24–70) years old, who underwent LSG and had 24 months of follow up. Mean initial BMI versus postoperative BMI were 36.22 (30.2–51) kg/m² and 27.92 (21.3–35) kg/m², respectively. Mean %EBL was 77.46%. Mean pre-operative fasting glucose levels and HbA1C decreased from 147,28 mg% (84–250) to 94,35 mg% (70–120) and from 7.0% (5.2–11.6) to 5.78% (5.3–6.9), respectively. At follow-up, 78% of diabetic patients did not require further oral treatment, while 20% showed a decrease in their medication. Global morbidity was 1,8%(1 hemoperitoneum and 1 perigastric hematoma), managed with medical treatment. We had no reoperations and no mortality.

Conclusion: LSG is a safe and an effective treatment for mild and well-controlled T2DM patients, achieving a successful metabolic control. Further follow-up is necessary in order to determine long-term results.

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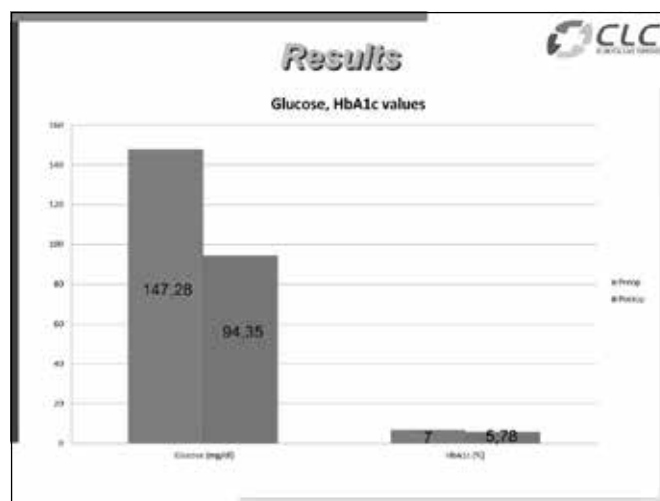


Fig. 1

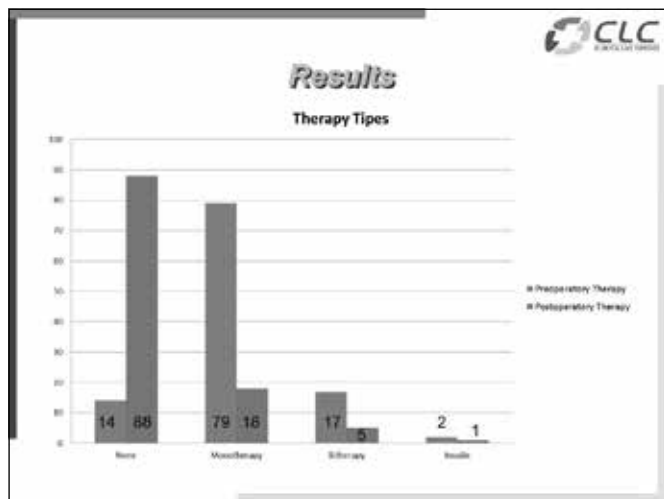


Fig. 2

PO3.004

Postoperative time-dependent correlation between HbA1c-reduction and body weight loss after bariatric procedures in Korean obese patients

[no abstract]

PO3.005

Laparoscopic sleeve gastrectomy versus Laparoscopic Roux-en-Y Gastric Bypass: A single centre experience with postoperative 2–5 years follow-up

[no abstract]

PO3.006

SADI Versus SASI As Metabolic Surgery

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Background and Aims: SASI, single anastomosis sleeve ileal, with the idea of bipartition for food pathway may have the two mechanisms fore-gut and hind-gut working. However the difference of getting part of the ingested food into normal pathway, duodeno-jejunal, may create possible differences. One is the durability of success of metabolic correction. The second is the nutritional deficiencies may be less due to the partially avoided duodenal jejunal exclusion.

Objectives: To compare the two procedures, operative and early postoperative complications, metabolic outcomes and nutritional deficiencies

Material and Methods: At ASU hospitals, Cairo, Egypt, the study included 40 morbidly obese patients with metabolic co-morbidities. The patients were randomly divided into two equal groups and were operated by one surgical team. Group A was operated by SASI and the other group B was SADI. Operative time, difficulties, conversion and early postoperative complications were recorded. Short term results during follow up were reported as regards weight loss, tensile. Fourteen metabolic correction and nutritional deficiencies.

Results: The two groups were matched as regards demographic parameters. All forty patients had metabolic co-morbidities. Twenty nine patients had DMII. Seventeen patients were hypertensive, Fourteen patients showed a high risk lipid profile. Earlier results, follow up range from 3 to 18 months showed no statistical significant difference as regards operative & early postoperative complications, However the SASI group had a significant shorter operating time and zero operating time. As regards weight loss results, remission of diabetes and lipid profile correction there was no sta-

tistical significant difference between the two groups. The SASI group had a better corrected serum calcium & serum iron levels compared to the SADI group with no statistical difference

Conclusion: From our study, the feasibility, complications (intraoperative and early post operative) are comparable in both procedures. But SASI has a significant shorter operative time. SASI patients showed the trend towards better serum iron and corrected calcium levels but this was not significant. Multicenter studies with longer follow up are needed to compare these two promising emerging metabolic procedure.

Disclosure: No conflict of interest declared

PO3.007

Numer Needed to Treat for remission of T2DM matters in bariatric / metabolic surgery

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Background and Aims: Bariatric surgery procedures are the most effective treatment of type 2 diabetes mellitus (T2DM) (1). The NNT (Numer Needed to be Treated) is useful tool to measure the difference in binary outcomes of treatment response such as diabetes remission or complication of intervention.

Material and Methods: The historical data from BAROS based electronic database on 168 Czech obese diabetic and 379 Czech morbidly obese non-diabetic patients were retrospectively analysed one year after various procedures of bariatric / metabolic surgery (BMS). Numer needed to Treat (NNT) was used to express the clinically significant differences in between different procedures in the single bariatric surgery center.

Results: The follow up one year after BMS was 83%, mortality within 30 days 0%. In general, one year after bariatric surgery the T2DM was not worsened in any patient, has not changed in 21%, has improved in 51% and resolved in 27%. According to NNT ranked in the order: gastric bypass (NNT of 2), sleeve resection (NNT of 3), gastric plication (NNT of 4) and gastric band (NNT of 20). The metabolic effect depends on the type of procedure ($p < 0.01$, Kruskal-Wallis) (2), though the differences in complication rate, according to NNH (Numer Needed to Harm) were not significant between bariatric procedures.

Conclusion: T2DM resolution one year after gastric bypass is a realistic and achievable goal for many cooperative and operable obese diabetics who may benefit from employment of the appropriate procedure (3,4). NNT seems to be a plausible tool for reporting the outcome of diabetes treatment by bariatric surgery.

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Disclosure: No conflict of interest declared

Sleeve gastrectomy and Roux-en-Y gastric bypass in the treatment of type 2 diabetes mellitus. Results of a multicenter, randomised controlled study.

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Background and Aims: The growing prevalence of obesity is followed by increasing incidence of type 2 diabetes mellitus (T2DM). Currently, the two most common surgical procedures for obesity are Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG). Few randomized controlled studies have compared these procedures in the treatment of obese patients with T2DM. The aim of the study was to compare diabetes remission rate (HbA1c < 42 mmol/mol, with or without diabetes medications) in obese T2DM patients (BMI 35–50) undergoing RYGB or SG.

Material and Methods: Forty-nine patients were included in four bariatric surgery centers in Sweden. Twenty-six were randomized to RYGB and 23 to SG. There were no difference between groups regarding patients characteristics, duration of T2DM, use of antidiabetic medications or glycemic control. Complete one-year follow-up data was available for 16 SG and 19 RYGB patients.

Results: At one-year postoperatively, patients in the RYGB group had significantly higher %EWL as compared to SG, 77.1% vs 62.6% ($p = 0.04$). There was no difference between groups regarding reduced use of medications lowering glucose, lipids and blood pressure. The T2DM remission rate after RYGB was 68% as compared to 50% after SG ($p = 0.268$). Glycemic control improved significantly in both groups with mean HbA1c of 40.5 ± 6.8 and 42.1 ± 8.6 mmol/mol after RYGB and SG, respectively ($p = 0.544$). There were no severe complications or deaths.

Conclusion: T2DM remission rate did not differ between RYGB and SG despite significantly higher %EWL after RYGB. Long-term follow-up data are needed to define the role of SG in the treatment of patients with obesity and T2DM.

Disclosure: No conflict of interest declared

Analysis of the sleeve gastrectomy and gastric banding in the department surgery Kazan Medical Academy hospital

[no abstract]

First National Safety Audit of Laparoscopic Sleeve Gastrectomy in Singapore

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Background and Aims: Obesity is the world's most prevalent metabolic disease and continues on a rising trend. In Singapore, this incidence rose to 10.8% in 2010. Bariatric surgery produces significant weight loss with

improvements in obesity-related comorbidities and survival. Laparoscopic sleeve gastrectomy (LSG), first performed as the initial step of a staged laparoscopic duodenal switch, is increasingly performed as a stand-alone bariatric procedure. It is now the most commonly performed locally. We present our first nationwide audit of its safety results.

Material and Methods: All patients who received LSG from 15 June 2006 (when the first procedure was performed in Singapore) to 15 June 2014 were included in this study. The safety profile of LSG was determined by assessing the early 30-day morbidity and mortality rates, as well as the late 1-year morbidity and mortality rates.

Results: A total of 641 patients underwent LSG in the study period. Our study population was predominantly female (55.9%) with a mean age of 39.1 ± 11.0 years, a mean body weight 118.8 ± 27.3 kg, and a mean BMI of 43.44 ± 8.39 kg/m². After excluding patients who had defaulted, 630 patients were identified for assessment of early complications. The 30-day morbidity rate was 3.49%, with 7 leaks (1.11%), 2 strictures (0.32%), 4 haemorrhages (0.63%), 4 wound infections (0.63%), 5 others (0.63%; including the 1 mortality from a pulmonary embolism). The 30-day mortality rate was 0.18%.

Late mortality and morbidity rates were calculated for 543 patients who reached at least a 1-year post-operative follow up. Of this group, 134 patients (24.68%) were lost to follow up and were excluded from analysis. There were no late mortalities in this group of patients. The overall late morbidity rate was 5.87%, with 1 late leak (0.24%), 2 strictures (0.49%), 19 de novo gastroesophageal reflux (4.65%) and 1 incisional hernia (0.24%).

Conclusion: LSG has a good safety profile locally, with low morbidity and mortality rates similar to published reports.

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Disclosure: No conflict of interest declared

Correction of cardiovascular risk in patients with morbid obesity using bariatric surgery

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Background and Aims: The rate of obesity is rising logarithmically, especially morbid obesity (BMI > 40 kg/m²). In Ukraine the obesity rate is 40%, the level of morbid obesity is about 2%. Obesity is associated with multiple risk factors for atherosclerosis, including hypertension, dyslipidaemia and impaired glucose tolerance. The higher the BMI the higher mortality rate.

Objectives: to study cardiovascular risk factors in patients with hypertension and morbid obesity after conservative and surgical treatment

Material and Methods: We examined 164 patients with morbid obesity (BMI > 40 kg/m²), they formed two groups. The first group included 81 patients who treated obesity with diet and drug Stifimol. The second group included 83 patients who underwent bariatric surgery (gastric bypass surgery). Patients were examined before and 6 months after treatment of obesity. All patients underwent clinical examination, determination of anthropometric parameters, measurement office SBP and DBP and daily monitoring of blood pressure, cardiac ultrasound, exploration indicators carbohydrate and lipid metabolism, definitions cardio – vascular risk with using scales SCORE, SCORE

HDL, SCORE BMI, PROCAM, DRS, FRAMINGHAM.

Results: Found that after 6 months of treatment, patients in both groups experienced a significant reduction in body weight. A significant decrease in body weight was observed in patients treated surgically (first group patients was a reduction in body weight of 5.5 kg (4.6%) patients in second group 35 kg (22.8%) which was associated with a greater reduction in office SBP, DBP, optimization daily profile of blood pressure, more reduction of LV hypertrophy, more positive changes in lipid and carbohydrate me-

tabolism and associated with reducing the number of patients at very high risk on a scale SCORE by 78%, on a scale PROCAM by 100%, on a scale FRAMINGHAM by 95,6% and on a scale DRS by 13% compared with patients who were treated conservatively.

Conclusion: Weight loss through the use bariatric surgeries contributes to normalization office SBP, DBP, BP profile, reduces left ventricular hypertrophy, positive effect on lipid, carbohydrate metabolism and decrease in cardio-vascular risk.

Disclosure: No conflict of interest declared

PO3.012

Value of routine polysomnography in bariatric surgery

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Background and Aims: Obstructive sleep apnea (OSA) is characterized by repeated episodes of upper airway collapse during sleep. Due to its strong association with obesity, the incidence of OSA increases to 70% in morbidly obese patients. OSA is a potentially life-threatening condition when not detected and managed appropriately. The best available method to identify the severity of OSA is polysomnography (PSG). However, routine PSG measurements in obese patients undergoing bariatric surgery have not been accepted as standard modality.

Objectives: We report our experience with routine clinical and ambulatory PSG and ambulant polygraphy (PG) in a cohort of bariatric surgery patients to determine the true incidence of OSA with respect to the different severity levels as determined by the apnea-hypopnea-index (AHI). **Material and Methods:** The percentage of patients with an AHI greater than 5, 15, 30, 60 and 90/hour were calculated. Consequently, the AHI was used as parameter for determining the number needed to screen.

Results: A total of 1361 patients were included. The study population consisted of 1127 (82.8%) women and 234 (17.2%) men. The mean age was 44.4 years (SD 10.9); mean BMI was 44.1 kg/m² (SD 6.4). The median AHI of the entire study population was 7.0/hour (interquartile range 16.2). This study shows that two-third of the bariatric surgery patients have OSA prior to surgery. An AHI greater than 15/hour, 30/hour, 60/hour and 90/hour is seen in 30%, 16%, 6% and 1% of the patients respectively. Consequently, in order to detect an AHI > 5, 15, 30, 60 and 90, a total of 2, 4, 7, 18 en 84 sleep studies should be performed to detect these severity levels.

Conclusion: OSA is present in the majority of bariatric surgery patients. Moreover, one-third of the bariatric surgery patients have an AHI greater than 15/hour and would benefit of CPAP therapy. In order to increase perioperative safety and avoid the preventable risk of perioperative complications, we recommend mandatory P(S)G prior to bariatric surgery.

Disclosure: Prof. Dr. H.J. Bonjer receives personal fees from Olympus and grants from Johnson & Johnson, Applied Medical and Medtronic. Prof. de Vries is a member of the Medical Advisory Board of NightBalance and has shares in Nightbalance. All other authors declare that they have no conflict of interest.

PO3.013

Modified biliopancreatic diversion by Scopinaro for the treatment of patients with morbid obesity

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Background and Aims: Morbid obesity – one of the leading factors of premature death due to pathology associated with it. Malabsorptive bariatric procedures can achieve perfect results, but with some compromises. According to the classical method proposed Scopinaro biliopancreatic diversion (BPD) consists of distal subtotal resection of the stomach, a division of the small bowel 250 cm from ileocecal valve, an anastomosis

of distal small bowel to the stomach, and creating a common limb (CL) length 50cm.

Material and Methods: 76 patients underwent BPD from 2007 to 2013 in our clinic. We have modified classic technique – performed resection only antrum and increased CL to 80–85 cm. The mean age of patients was 42 years. The mean body mass index (BMI) in patients was 47 kg/m² (38–63). Comorbidities: type II diabetes was diagnosed 19 (25%) patients, arterial hypertension - 16 (21%), hyperlipidemia in 17 (22.4%) patients preoperatively.

Results: Decrease in body weight was observed in the first year faster, and after 24 months BMI was on average 32 kg/m² (28–36). 2 cases of protein deficiency (2.6%) in non-compliance patients. Repeated surgery for lengthening the CL no patient needed. Iron deficiency anemia was detected in 18 (23.6%) patients. Obesity-associated disease: in 17 of 19 patients (89%) with diabetes and in 11 of 16 (68%) with hypertension leveled. Cholesterol and triglycerides were normalized at 100% of patients at 1 year after surgery. The most frequent complications after surgery were gastrostasis - 18 cases (23%) and the peptic ulcers of the stomach - 9 (11.8%). **Conclusion:** BPD – the most effective combined bariatric procedure with long-lasting results in terms of weight loss and improvement of obesity-related diseases. In terms of postoperative complications comparable with other bariatric procedures. Our results show that increasing the length of the CL to 80–85 cm successfully offset the metabolic complications without reducing the overall effect of the surgery.

Disclosure: No conflict of interest declared

PO3.014

Improvement of nonalcoholic fatty liver disease in morbidly obese patients after sleeve gastrectomy: Association of ultrasonographic findings with lipid profile and liver enzymes

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Background and Aims: Liver steatosis is the most common grade of the nonalcoholic fatty liver disease (NAFLD) among patients undergoing bariatric procedures. After surgery an improvement or even complete resolution of NAFLD in morbidly obese patients is achieved, but little is known about the effect of laparoscopic sleeve gastrectomy (LSG).

Objectives: Evaluation of liver steatosis degree and correlation with plasma liver enzymes.

Material and Methods: A prospective observational study of patients undergoing LSG as bariatric technique between October 2007 and May 2012 was performed. An abdominal ultrasonography and blood sample extraction (investigating liver enzymes and lipid profile) were performed preoperatively and 12 months after surgery.

Results: 50 patients were included in the study. Preoperatively, 84% of the patients presented liver steatosis. A significant reduction of steatosis could be observed 12 months after surgery ($p < 0.001$), achieving a complete disappearance in 90.5% and at least a regression in 95% of the patients with preoperative steatosis. Preoperative degree of steatosis showed a direct correlation with AST (Spearman 0.313; $p = 0.008$) and ALT (Spearman 0.310; $p = 0.007$) and an inverse correlation with HDL-cholesterol (Spearman -0.420; $p = 0.019$). The reduction of liver steatosis showed an inverse correlation with the increase of HDL-cholesterol between pre and postoperative determinations (Spearman -0.467; $p = 0.008$).

Conclusion: Liver steatosis, as measured by ultrasonography, improves after sleeve gastrectomy, achieving a complete resolution in 90% of the cases. Preoperative steatosis correlates directly with AST and ALT levels and inversely with HDL-cholesterol. The postoperative increase of HDL-cholesterol shows an inverse correlation with liver steatosis improvement, suggesting that it could be a good marker for monitoring the postoperative liver status.

Disclosure: No conflict of interest declared

PO3.015

Maintenance of multivitamin supplements after sleeve gastrectomy

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Background and Aims: After all bariatric procedures, multivitamin supplements are uniformly prescribed to minimize eventual deficiencies. These supplements are usually maintained long time, even during the whole life after malabsorptive techniques, while these are maintained at least during one year after restrictive procedures. Given that sleeve gastrectomy does not alter intestinal absorption, the supplements are possibly unnecessary, once the patient can take an adequate diet.

Material and Methods: A prospective randomized study of patients undergoing a laparoscopic sleeve gastrectomy was performed. Patients were randomized into 2 groups: those patients receiving the multivitamin supplement (Multicentrum, Pfizer, 1 tablet/day) during 3 months (Group 1), and those receiving the supplement during 12 months (Group 2). Laboratory data were recorded: vitamins (D, B12 and folic acid) and oligoelements (calcium, iron, phosphorus, magnesium and zinc) at 3, 6 and 12 months after surgery.

Results: 80 patients were included, 40 in each group. At 3 months, 7.5% of the patients presented iron deficiency and 2.5% ferritin one, similarly in both groups, that was corrected with specific extra iron supplements. At 6 months, 1 patient (2.5%) in Group 1 presented iron deficiency and 1 in Group 2 vitamin D deficiency (NS). At 12 months, only 1 patient in Group 2 presented vitamin D deficiency, treated with specific supplements.

Conclusion: The maintenance of multivitamin supplements more than 3 months postoperatively seems to be of no benefit. It is preferable monitoring laboratory values and adding specific supplements when necessary.

Disclosure: No conflict of interest declared

PO3.016

Gastrointestinal symptoms after bariatric surgery

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Background and Aims: Changes in obesity-related diseases and self-reported quality of life after bariatric surgery have been reported. Literature is still scarce regarding adverse gastrointestinal symptoms (Rome-criteria) before and after laparoscopic sleeve gastrectomy (LSG) and roux-Y gastric bypass (RYGBP). We studied prevalence of subjective gastrointestinal symptoms before and one year after LSG and RYGBP.

Objectives: To analyse patient-reported data based on the Rome II criteria and IBS Symptom Questionnaire2.

Material and Methods: Data from "Rome II short form" Norwegian questionnaires were consecutively collected at baseline and 1 year after bariatric surgery.

Results: 215 patients were included. Complete data were obtained from 127 patients; 64 patients operated with RYGBP (69% females, mean age 40,8, mean BMI 40,0) and 63 patients operated with LSG (70% females, mean age 40,9, mean BMI 42,8). Degree of bloating and diarrhea decreased in both groups (RYGBP and LSG) after surgery. Degree of constipation and anorexia increased in both groups (RYGBP and LSG) after surgery. Degree of abdominal pain and nausea were unchanged in both groups (RYGBP and LSG) after surgery. Rate of patients with epigastric discomfort increased after RYGBP. Rate of patients with gastroesophageal reflux symptoms decreased after RYGBP.

Conclusion: More constipation, less bloating in both groups; improved reflux symptoms but more epigastric discomfort after RYGBP.

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Disclosure: No conflict of interest declared

Rome II criteria/op. type	RYGBP				LSG			
	n	n pos pre	n pos 12m	p-value (McNemar)	n	n pos pre	n pos 12m	p-value (McNemar)
Abdominal pain or discomfort	64	25	26	1	63	21	18	0.6476
Pain or discomfort centered in the upper abdomen	61	30	29	0.0026	64	12	14	0.7905
Heartburn or burning retrosternal discomfort or pain	61	28	5	<0.0001	63	36	28	0.1698

Table 1: Rome II criteria before and 12 months after RYGBP and LSG

IBS Symptom Questionnaire [VAS 0-10]/op.	RYGBP				LSG			
	n	mean pre	mean 12m	p-value (paired samples t-test)	n	mean pre	mean 12m	p-value (paired samples t-test)
Nausea	63	1.14	1.59	0.1041	60	1.03	1.6	0.0912
Bloating	62	3.71	2.85	0.0331	60	3.03	2	0.0094
Abdominal pain	62	2.15	1.95	0.6343	60	1.75	1.6	0.6601
Diarrhea	62	2.81	2.03	0.0266	60	2.22	1.5	0.014
Constipation	62	1.1	2.02	0.0041	60	1.12	2.4	0.0006
Anorexia	60	0.47	1.52	0.0006	60	0.5	1.3	0.0346

Table 2: IBS Symptom Questionnaire (VAS 0-10) before and 12 months after RYGBP and LSG

Fig. 1

PO3.017

Weight loss, reflux and reoperations: Our first 100 patients treated with lap. Sleeve Gastrectomy

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Background and Aims: The laparoscopic sleeve gastrectomy (LSG) is the most commonly performed bariatric procedure worldwide. For the long-term follow-up, the durability of weight loss success and the incidence of clinically relevant gastro-oesophageal reflux are still under discussion.

Material and Methods: This retrospective study comprises our first 100 patients from three bariatric centres (Medicine University Vienna, Hospital Klosterneuburg and Hospital Rudolfsstiftung Vienna) treated with LSG. The mean follow-up in this study was 10 (range 8–13) years. Weight loss success, weight regain and the incidence reoperations were analysed as well as Quality of Life (QoL), which was surveyed by standardized questionnaires (BAROS, SF36, GIQOL, RSI, BQL). Gastro-oesophageal reflux was assessed by gastroscopy (including biopsy) as well as manometry and 24-hour pH-metry.

Results: Half of our patients have been examined by the day of submission of this abstract.

The mean operative weight was 135 ± 825kg, corresponding a mean BMI of 48 ± 8kg/m².

Over the time of the 10 year follow-up, a third of the patients were converted to a gastric bypass due to significant weight regain or symptomatic reflux. We offer a detailed presentation of weight loss data and the results of the gastroscopy, manometry, 24-hour pH-metry as well as data on patients' QoL.

Conclusion: In the evaluation of the first part of our 100 LSG patients with a long-term follow-up of 8 years or more, a high conversion rate to

a gastric bypass was observed. To make a statement on the incidence and relevance of postoperative reflux and Barrett oesophagus after LSG, the results of this ongoing study will have to be awaited.

Disclosure: No conflict of interest declared

PO3.018

Management of Leak after sleeve Gastrectomy

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Background and Aims: Leaks after sleeve gastrectomy is one of the most dreaded complications. The morbidity of the patient increases many folds with long hospital stays, has to undergo multiple procedures, and the cost of patient goes very high. It is a big financial and mental burden on the patient, health system and the operating surgeon.

Objectives: Discussing management of a case of leak post Sleeve Gastrectomy using fully coated long Mega stent.

Material and Methods: An Asian male aged 26 years having a BMI of 48.3 with no co-morbidities underwent laparoscopic Sleeve Gastrectomy at our centre as per the guidelines. Patient complained of Fever on the 10th post-operative day. On evaluation was found to have raised blood counts (21,00/cmm). Patient was subjected to Oral Contrast CT Scan which did not show any leakage of dye but showed a large collection lateral to the staple line. CT guided aspiration of the collection was attempted but patient developed hemothorax on the left side and an urgent Inter costal drainage tube was inserted to drain the blood. Attempt to drain the collection laparoscopically was not possible due to dense adhesions and proximity of vital organs. So open laparotomy was done and the collection was completely drained. Naso jejunal tube was kept for the feeding.

On the 5th post operative day drain showed bile in it. Urgent endoscopy was done and site of leak was identified and Fully coated long Mega stent was placed with Naso jejunal tube was placed to continue the feeding.

Results: Stent was removed after 8 weeks and fistula site was completely healed.

Conclusion: Leaks after sleeve gastrectomy are very difficult to manage and require multi-disciplinary approach. Intraabdominal lavage and drainage of collection with Placement of Mega stent fully coated ones is an appropriate method for management of gastric leaks

Disclosure: No conflict of interest declared

PO3.019

Early dumping syndrome is not a complication, but a natural element and a tool to control energy intake, according to patients' perspective after gastric bypass

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Background and aims Dumping syndrome (DS) is well known gastric bypass surgery and often described as a complication. DS is due to rapid delivery of hyperosmolar nutrients into the small intestine, release of vasoactive substances, incretins and hormones, causing numerous symptoms 10-30 minutes postprandial. DS comprises both gastrointestinal (e.g. abdominal pain, diarrhea, borborygmi, nausea and bloating) and vasomotor symptoms (e.g. tiredness, a need to lie down after meals, palpitations, perspiration, tachycardia and hypotension).

The aim was to investigate DS from the patient's perspective, by using a qualitative method, and thereby increase knowledge on how health care should present and relate to the DS.

Material and methods 12 (8 women) patients, 47 (range 32-58) years old were interviewed 9 years (range 8-10) after gastric bypass. The interviews were audio-taped and transcribed in verbatim, followed by an inductive

content analysis process, revealing one core category and five sub-categories, concluding patient's experience of the phenomenon.

Results The core category „dumping syndrome is a natural element of surgery and a tool to control food intake“ were identified and none of the participants wanted to be without the limiting factor that they considered the DS constitutes. Five associated sub-categories were related to the core category: The emergence and effects of DS were seen multidimensional and although many described DS as very unpleasant, it was perceived as something positive. All patients developed coping mechanisms and ingenious strategies postoperatively to master DS. Patients also reported a large degree of self-blame, explaining how it was their own fault if they exposed themselves to DS and its consequences.

Conclusion Based on the patients' perspective, dumping syndrome is perceived to give control of food intake and although the symptoms were obvious and very unpleasant after gastric bypass, patients considered dumping syndrome as a positive security against over-consumption. Hence, health care professionals should not present dumping syndrome as a complication but as a way that might contribute to control of eating behavior and excessive food intake.

Disclosure: No conflict of interest declared

PO3.020

Biliopancreatic diversion with duodenal switch – laparoscopy is safe and reduces length of stay

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Background and Aims: Unsatisfactory weight loss after gastric bypass or sleeve gastrectomy in super-obese patients is a growing concern. Biliopancreatic diversion with duodenal switch (BPD-DS) results in greater weight loss, and can be performed as an open procedure (OBPD-DS) or through laparoscopy (LBPD-DS). The aim was to study peri- and post-operative outcomes of OBPD-DS and LBPD-DS in Sweden.

Material and Methods: Data source was the Scandinavian Obesity Surgery Registry (SOREg). 317 BPD-DS patients (mean BMI 56.7 ± 6.6 kg/m², 57% females and 38.4 ± 10.2 years) were analyzed. The 264 patients undergoing OBPD-DS were older than the 53 LBPD-DS patients, (39.1 versus 35.0 years (p = 0.01). Follow up at 30 days was complete in 98% of patients.

Results: Operative time was shorter for OBPD-DS compared with LBPD-DS, 150 ± 31 minutes and 163 ± 38 minutes (p = 0.01), respectively, although more bleeding was noted in the OBPD-DS group, 216 ml versus 94 ml (p < 0.001). OBPD-DS patients stayed longer in the hospital than LBPD-DS patients, 6.6 days versus 3.3 days (p = 0.02). No significant differences in complications within 30 days were seen (17% and 12% for OBPD-DS and LBPD-DS, respectively). Three out of four leakages in the OBPD-DS patients were located at the top of the gastric tube while both leakages in the LBPD-DS group were located at the enteroanastomosis.

Conclusion: LBPD-DS can be safely performed by dedicated bariatric surgeons as a single stage procedure. Laparoscopy halved length of stay, without increased risk for complications. The long-term weight result is pending..

Disclosure: No conflict of interest declared

PO3.021

Creation of a de novo retrogastric tunnel during resiting of slipped gastric bands is associated with improved outcomes

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Background and Aims: A lack of clarity remains over the optimal strategy for the management of laparoscopic adjustable gastric band (LAGB) slippage, which, although rare (<1%–20% in published series), can result in gastric erosion, ischaemia or perforation. The aim of this study was to explore outcomes following resiting of slipped LAGBs in a single centre. **Material and Methods:** A retrospective analysis of computerised records, notes and prospectively-maintained bariatric databases was undertaken to identify all patients with a slipped LAGB.

Results: Thirty patients were diagnosed with a slipped LAGB over the study period (local slip rate 3.1%; 90% female; median age at first LAGB insertion 40 years) but complete data were available in 28.

Of these 28, 23 (82%) underwent emergency resiting upon admission; whereas, five (18%) underwent planned, expedited resiting. There were no complications related to emergency or planned intervention. Of the 23 patients managed as an emergency, seven (30%) required future surgery (three LAGB replacement and four LAGB removal).

Intra-operatively, fourteen patients (50%) had a de-novo retrogastric tunnel fashioned during LAGB resiting, which was associated with a significantly decreased risk of future operative intervention 21% de-novo tunnel (3/14 in total 33.7 years follow-up) vs. 60% pre-existing tunnel (3/5 in total 6.4 years follow-up); $p = 0.002$ Log rank test; nine patients tunnel status not recorded).

Overall, the risk of further interventions following LAGB resiting was 0.15/year with 25% requiring further intervention within two years and 50% within five years (Kaplan-Meier analysis); however, none of the patients undergoing band resiting via de-novo tunnel formation required further intervention within a two year period.

Median excess body weight loss (EBWL) for patients with in-situ LAGBs at the end of the study period was 42.5% and there was no statistical difference between de-novo and pre-existing tunnel groups (Wilcoxon rank sum test $p = 0.43$).

Conclusion: Resiting of slipped LAGBs is safe and allows continued weight loss. Although a significant risk of future operative intervention remains, this can be reduced via the creation of a de-novo retro-gastric tunnel for band resiting.

Disclosure: No conflict of interest declared

PO3.022

Long-term outcome of laparoscopic adjustable gastric banding (LAGB): Results of a Swiss single-centre study of 405 patients with up to 18 years follow-up

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Background and Aims: LAGB seemed to be a very promising bariatric procedure but many studies showed high rates of re-operation due to complications or insufficient weight loss. There is lack of long-term studies with a follow-up beyond 15 years.

Material and Methods: Retrospective analysis of prospectively collected clinical data on weight loss, co-morbidities, re-operations, complications, and quality of life including BAROS score (Bariatric Analysis and Reporting Outcome System) in a cohort of 405 patients having undergone LAGB was performed. Follow up (FU) was conducted in our outpatient clinic or via telephone interview.

Results: 405 patients (age 41 ± 10 years, BMI 44.3 ± 6 kg/m²) were treated with a LAGB between 1996 and 2010. Mean FU was 13 ± 3 years, with a FU rate of 85% (range 8–18 years) corresponding to 343 patients. 100 patients exceeded a FU period of 15 years. In 216 patients (63%) the LAGB was removed and another bariatric procedure performed: 32 (9%) patients underwent lap. sleeve gastrectomy, 102 (30%) lap. gastric bypass and 82 (24%) biliopancreatic diversion with duodenal switch due to either band intolerance, slippage, insufficient weight loss or secondary weight

regain; 27 (8%) patients refused further bariatric surgery after band removal. Total failure rate was 63%. Finally, 100 (30%) patients still have the band in place with a mean BMI of 35 ± 7 kg/m², corresponding to an excessive BMI-loss of $48 \pm 27\%$. Of these, the failure rate was 25%, according to BAROS; 50% had a good to excellent outcome.

Conclusion: More than 10 years after LAGB 70% of patients lost their bands and only 12% have the band in place and a good to excellent result according to BAROS..

Disclosure: No conflict of interest declared

PO3.023

The postoperative checklist for bariatric surgery; which parameters should be used?

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Background and Aims: Morbidly obese patients are at higher risk of complications after surgery. In bariatric surgery pre- and intra-operative checklists are commonly used to identify high risk patients preoperatively, in order to decrease the number of postoperative complications. However, in current literature information on the use of postoperative checklists, addressing regularly measured parameters, such as heart rate, C-reactive protein (CRP) and hemoglobin values, is scarce. This study evaluates the usefulness of parameters in a postoperative checklist for bariatric surgery.

Material and Methods: An in-house developed postoperative checklist was used during ward rounds on the first postoperative day after bariatric surgery and included information on nausea, pain, temperature, heart rate and laboratory markers. Data was prospectively collected, since introduction of this postoperative checklist. Complications were scored using the Clavien-Dindo (CD) classification and three groups were formed; no complications (CD0), minor complications (CD1 and 2) and major complications (\geq CD3a). Differences between groups were analyzed using nonparametric tests.

Results: 694 subjects were included (79.5% female, age 42.6 ± 10.8 years, BMI 43.8 ± 5.8 kg/m²). 118 subjects developed a minor complication and 29 subjects a major complications within 30 days postoperatively. There were no significant differences in baseline characteristics between groups. Subjects with major complications were less willing to be discharged due to complaints, compared to subjects with no or minor complications (14.8% vs. 3.6% and 4.6%, respectively) and had a higher decrease of hemoglobin level (0.8 vs. 0.6 and 0.65 mmol/l, respectively). No differences were seen in the other parameters. The negative predictive value of this checklist was 98%, while the positive predictive value was only 6%.

Conclusion: The patients willingness for discharge, in combination with hemoglobin decrease, may be the best early predictors of the occurrence of major complications after bariatric surgery. Further analysis will identify which parameters should be monitored postoperatively and proper cutoff points for those parameters. Based on this analysis, a new checklist will be formed, which may play a role in the decision making of early discharge after bariatric surgery.

Disclosure: No conflict of interest declared

PO3.024

Case-control study of postoperative blood pressure in patients with hemorrhagic complications after laparoscopic sleeve gastrectomy and matched control

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Background and Aims: Laparoscopic sleeve gastrectomy (LSG) is one of the most popular bariatric procedures in Europe. LSG is associated with risk of serious adverse events, including hemorrhagic complications (HC)

in postoperative period. It is unclear whether high blood pressure in postoperative period may contribute to increased risk of bleeding.

Objectives: A case-control study of postoperative blood pressure was undertaken in patients with bleeding after LSG and matched controls.

Material and Methods: Fourteen patients after LSG with HC in postoperative period were matched with fourteen controls. The controls consisted of patients who underwent LSG and did not experience any adverse events, including bleeding, gastric leak or stricture. Matched variables including age and gender. 12 hour postoperative blood pressure recording were performed (after surgery) in all patients.

Results: Patients who experienced hemorrhagic complications after LSG had significantly decreased mean systolic blood (SB) pressure (mmHg) in 8th hour of postoperative observation (122.1 ± 11.3 vs 134 ± 16.7 ; $p < 0.01$), mean difference -15.6 (95% CI -26.1 to -5.1). Differences in the rest of blood pressure either SB and diastolic blood (DB) were not statistically significant. (Figure 1)

Conclusion: Compared with closely matched control subjects, patients who experienced hemorrhagic complications after LSG have decreased systolic blood pressure in 8th hour of observation in postoperative period. However, the levels were within normal limits. The presence of hemorrhagic complications after LSG is not associated with high blood pressure in postoperative period.

Disclosure: No conflict of interest declared

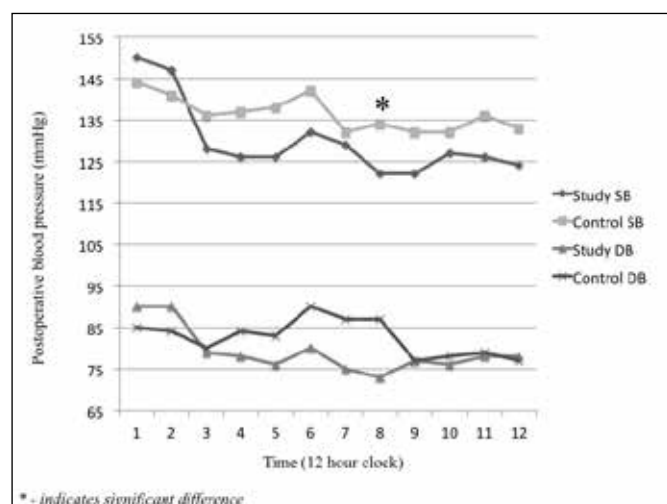


Fig. 1.

PO3.025

Gallstone-like enterolith causing small bowel obstruction and perforation, three years after Roux-en-Y gastric bypass and 21 years after cholecystectomy.

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Background and Aims: Enteroliths are an uncommon phenomenon of the gastrointestinal tract. They are categorized as true or false primary and secondary enteroliths according to their composition and site of origin. The trigger mechanism for enterolith formation is associated with numerous conditions affecting the integrity and flow of the bowel including bowel surgery and metabolic disease. Roux-en-Y gastric bypass patients suffer from a number of these. We present a previously unreported case as well as a literature review.

Results: A 46 year old female with a history of cholecystectomy 21 years prior and a Roux-en-Y-gastric bypass 3 years prior presented with symptoms of abdominal pain, distension and vomiting over a course of two weeks. A CT scan with peroral and intravenous contrast revealed small

bowel obstruction. Laparoscopy revealed an obstruction 50 cm from the terminal ileum caused by a 45 x 40 mm concretion that eroded into the ileal wall with a small perforation covered by the omentum. A mini-laparotomy allowed for a small resection at the site of the perforation and the stone was removed through here. A side-to-side stapled anastomosis was made. Stone analyses revealed a content very much similar to the contents of gallstones.

Conclusion: Stomach surgery, leading to impaired gastric motility and diminished acid secretion as well as impaired pyloric function are known risk factors in bezoar formation, and there are at least 20 reported cases of primary enteroliths causing afferent loop syndrome following hepatico-jejunostomy, Billroth II resection, Whipple's procedure and Roux-en-Y procedures. In this case the most likely scenario is that the stone has been formed within the Roux limb, then dislodging and migrating with impaction in the ileum and is as such a migrating true primary proximal enterolith. To our knowledge, this is the first reported case in the literature.

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Disclosure: No conflict of interest declared

PO3.026

Gastric ulcer hemorrhage after intragastric balloon insertion-case report.

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Background and Aims: Some morbidly obese patients do not qualify for bariatric surgery due to general health contraindications. Intragastric balloon treatment might be therapeutic option in the above mentioned cases. It appears to be a safe, tolerable, and potentially effective method. There were reported some complications of this method, however to the best of our knowledge there was no report dedicated the life threatening bleeding from gastric ulcer. Our goal is to describe such a case to inform medical society of such possibility.

Material and Methods: We report a case of a 42-year-old man, with history of type 2 diabetes mellitus, hypertension, dyslipidemia, sleep-apnea syndrome, fatty liver, who underwent an uneventful intragastric balloon insertion (initial BMI 57,8). There was no pathology in the preoperative gastroscopy. His post-treatment course was unremarkable for the first twenty weeks. Afterwards he was urgently admitted to hospital after losing consciousness. Among other symptoms we found weakness, easy fatigue and melaena for a few days. For the last seven days he took doxycycline, ordered by GP because of pharyngitis and acetylsalicylic acid – without prescription. Laboratory results revealed hemoglobin- 5,8g/dL and hematocrit- 18,4%. After stabilization by blood transfusion and the administration of proton pump inhibitor an emergency gastroscopy was performed. The balloon was removed. Coffee-ground color gastric contents was aspirated. Multiple gastric erosions and an ulcer with signs of recent hemorrhage (Forrest II a) were found. It was treated with argon plasma coagulation. Helicobacter pylori test was positive.

Results: In the presented case we observed possible life-threatening complication in a form of gastric bleeding as a consequence of coincidence of gastric balloon, the use of acetylsalicylic acid and Helicobacter pylori infection.

Conclusion: We need to identify and reduce risk factors of gastric ulcer in patients with intragastric balloon. It is particularly important to inform the patient not to apply any medications without consulting a doctor.

Disclosure: No conflict of interest declared

Treatment of Deficiencies after Biliopancreatic Diversion with or without Duodenal Switch; a Major Challenge.

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Background and Aims: Nutritional deficiencies are a major concern after biliopancreatic diversion (BPD) and BPD with duodenal switch (BPD/DS). A recent study showed that up to 93% developed any kind of deficiency within 3 years after surgery. To date, there is no single multivitamin supplement (MVS) that meets all the nutritional requirements after BPD or BPD/DS.

Objectives: The present study summarizes our attempts to treat nutritional deficiencies in patients after BPD and BPD/DS. These experiences may serve as basic information to develop treatment schedules for various deficiencies occurring after BPD and BPD/DS.

Material and Methods: Thirty-four patients were included in this one-year observational study. At referral (T0) complete nutritional screening was performed, and then at 6 (T6) and 12 (T12) months. In between, additional blood withdrawals were performed as indicated to evaluate the effects of dose adjustments. After the T0 blood withdrawal an optimized MVS was prescribed to all patients (WLS Forte®, FitForMe, Rotterdam, the Netherlands).

Results: At the time of referral (T0) the mean percentage EWL was 62 ± 5%. No significant differences in nutritional deficiencies were found between BPD and BPD/DS. In total 13 patients developed an iron deficiency (ID) at T0. After a significant dose increase from 66mg to 116mg the number of IDs decreased to one. In addition, eight patients were treated with intravenous infusion of ferric carboxymaltose injection. Thirteen patients were using hydroxocobalamin injections at T0, one additional patient had a vitamin B12 deficiency de novo. All patients were adequately treated with hydroxocobalamin injections. Nine-teen patients were diagnosed with vitamin D deficiency at T0. Vitamin D deficiency was treated by oral Cholecalciferol 50.000 IU/ml once weekly. In addition, sixteen patients required a higher doses, up to 250.000IU/ml weekly. Comparable data is available for vitamin A/B1/B6, and zinc and will be presented at the congress.

Conclusion: Nutritional deficiencies are common after BPD and BPD/DS. It is considered to be a major challenge to adequately treat these deficiencies. There is no standard treatment available and treatment must be individualized. Our experiences may serve as basic information to develop treatment schedules for various deficiencies occurring after BPD and BPD/DS.

Disclosure: Dr. F.J. Berends and Dr. I.M.C. Janssen are consultants for Fit For Me, Rotterdam, the Netherlands.

Bleeding after laparoscopic sleeve gastrectomy: Results of a single centre of excellence after over 600 procedures

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Background and Aims: Laparoscopic sleeve gastrectomy (LSG) is becoming the second most performed bariatric/metabolic procedure in the world

1. Major complications after LSG occur in 5% of patients, with a bleeding rate of 1–6%
2. The percentage of re-operation for complications ranged from 0% to 10%, with a mean of 1.6%

3. The aim of this retrospective study was to evaluate the efficiency of re-inforcement in prevention of post LSG bleeding with standardization of the technique.

Material and Methods: From January 2012 to December 2016, prospectively maintained database was investigated about the incidence of post-operative bleeding. A total of 671 LSG were performed and calibrated on 42 Fr bougie using Stapler 60 mm (Ethicon Echelon™ Stapler-Echelon Flex™) with cartridges reinforced with absorbable synthetic buttress material (Gore®Seamguard®). During laparoscopic haemostasis revision, blood pressure was maintained higher than 100/70 and an intra-abdominal pressure lower than 15mmHg. Intra-abdominal drainage was routinely placed with strict monitoring of the parameters for the first 36 h.

Results: Out of 671 LSG, ten patients (1.56%) had post-operative bleeding. Intraoperatively, the source of bleeding was; 5 cases from gastrolysis, 2 from staple line, 1 from spleen, 1 from liver, 1 from the 12 mm trocar. Six of these required laparoscopic re-operation for haemodynamic instability (5 pts) or large haematoma (1 pts), however, one case required open splenectomy, so, the conversion rate was 10%. The remnant 4 cases required non-operative management with blood transfusion in 3 of these and clinical management in the last one. Mortality rate was 0% with a mean hospital stay prolongation to 4.2 days.

Conclusion: Our results confirm the effectiveness of buttress materials as reducing-bleeding product, with an incidence rate similar to these reported in literature. Standardization of the surgical technique together with the use of buttress makes LSG, which is a procedure with high risk of bleeding from the long suture line, safer with less bleeding rates.

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Disclosure: No conflict of interest declared

Perigastric abscess 6 months after Laparoscopic Sleeve Gastrectomy (LSG). Case Report and review of literature.

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Background and Aims: Laparoscopic Sleeve Gastrectomy (LSG) is nowadays a well established primary bariatric procedure. Leaks remain a major concern and most feared complications. Although a position statement on leaks management has been recently published, few data have been published on late leaks and perigastric collections. We report the case of a late perigastric abscess after a LSG without evidence of gastric leak.

Case presentation and management: A 28 years old female (BMI 58 kg/m²) underwent Laparoscopic Gastric Plication (LGCP) for morbid obesity on May 2012. She developed symptoms of heartburn and reflux 2 years after LGCP and upper GI routine series documented an upper gastric pouch. She underwent conversion to LSG, and the post-op course was uneventful. Six months after LSG the patient was re-admitted at our Unit for nausea, vomiting and acute epigastric pain, without fever and signs of septic shock. A computed tomography (CT) scan with iodinate contrast documented a collection (2 x 4 cm) close to the upper part of the staple line. Upper GI series failed to show a gastric leak. Antibiotic therapy was started and the patient underwent CT guided drainage of the perigastric abscess and irrigation with Gentamicin. A swab of the pus was positive for *Streptococcus Anginosus*. The patient continued the antibiotic treatment per os with reduction of WBC count and CRP level and regression

of symptoms. She was discharged with antibiotic therapy and a new CT scan 15 days later was completely negative for abscess.

Discussion: At present, the management of perigastric collections after LSG is still based on expertise and resources of the Center where the patient are referred. Surgical drainage of collections or abscess is essential in septic patients. Patients in stable conditions can be successfully treated and approached percutaneous guided drainage. In literature we found only one case of a collection infected by *Streptococcus Anginosus* after open LSG, responsive at conservative treatment.

Conclusion: Our case report remarks the importance of a “customized” approach to patients with complications. In our case, conservative treatment successfully tackled a potentially threatening complication of a collection infected by *Streptococcus Anginosus* after open LSG, responsive at conservative treatment.

Disclosure: No conflict of interest declared

PO3.030

Laparoscopic management of bariatric surgery complications

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Objectives: In early phase of learning curve in bariatric surgery grade 3 to 5 CTCAE complications may occur. The management of them includes a wide variety of surgical and non-surgical maneuvers.

Material and Methods: 120 patients operated between June 2012 and December 2015 from which 5 patients developed complications from which 2 needed relaparoscopy and 1 radiological guided maneuvers.

Results: A 34 years old male patient presented with extensive ecchymosis of the anterior abdominal wall (probably due to one trocar site hemorrhage), conservatively treated. Another 24 years old male patient presented nausea and vomiting in the first postoperative day and an intraabdominal hematoma due to gastric stump hemorrhage mimicking a gastric volvulus successfully managed laparoscopically. A 53 years female patient with comorbidities: sleep apnea, systemic lupus erythematosus which developed a first episode of hemorrhage in the first postoperative day and laparoscopic hemostasis was provided. One week after discharge the patient was readmitted with signs of hypovolemia and intraperitoneal bleeding. A new laparoscopic exploration was needed and it revealed hemoperitoneum without evidence of source. The patient developed a left upper quadrant abscess managed by ultrasound guided drainage and then pressure wound at one buttock which needed plastic surgery.

Conclusion: Considering the particularities of these cases all the efforts should be made to manage the postoperative complications with minimally-invasive methods and to avoid a laparotomy.

Disclosure: No conflict of interest declared

PO3.031

Gastro-pulmo- bronchial fistula after leak in resection line in sleeve gastrectomy

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Background and Aims: Leak in resection line in sleeve gastrectomy is a harmful complication. The solution is not easy sometimes. In some cases even total gastrectomy was described.

Objectives: The knowledge of possible solution of severe complications could make the therapy better. The authors present case report about complicated and prolonged course of such a leak.

Material and Methods: 27 year old woman after sleeve gastrectomy experienced leak in proximal part of resection line. Reoperation and drainage was needed. The gastrocutaneous fistula healed in three weeks. In 2 month time the fistula was again patent. New drainage was inserted. Endoscopically OVESCO clips were applied unsuccessfully. After successive extraction of the drain new gastrocutaneous fistula was created . This fistula has not healed, but gastro-pulmo-bronchial fistula was detected. This was treated successfully by inserting the esofagogastric stent, thoracic drainage and pulmoal resection.

Results: More than one year after the operation was the complication in young woman solved.

Conclusion: Bariatric/metabolic surgery is very specific topic. The complications could be life threatening. The multidisciplinary approach is essential in the treatment of such a case..

Disclosure: No conflict of interest declared

PO3.032

Intrathoracic migration after LSG – can it be controlled?

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Background and Aims: A migration of the proximal end of the suture above the level of the diaphragm could be observed in postoperative examinations, indicating a mediastinal herniation of the upper sleeve; this might be identified as a possible cause of specific postoperative symptoms like persistent regurgitation, heartburn or even total obstruction. AIM: To identify the strategy to prevent, diagnose and treat the intrathoracic migration after LSG.

Material and Methods: We have conducted a prospective study to identify the specific conditions that promote intrathoracic migration and the possibilities to prevent and treat it. The results of the routine intraoperative stomach fixation to pre-pancreatic fascia were analyzed in a cohort of five hundred consecutive obese patients who undergone laparoscopic sleeve gastrectomy (LSG) in 2015 and compared with the outcomes of a similar group of 500 LSG patients having no fixation of the gastric tube.

Results: Extensive data on the exact geometrical behavior of sleeve stomachs and other parameters have hardly been investigated. The three-dimensional gastric shape and its possible changes after LSG represented a diagnostic challenge. Even in cases associated with specific symptoms, presence of sleeve migration was significantly underestimated by both conventional radiology and upper GI endoscopy, CT being more accurate for the detection of morphological alteration. Radiological signs of mediastinal migration of the upper sleeve were more often identified in the non-fixating group (48%) versus the fixating group (14%). Symptomatic migration was present in 16% of the non-fixating group while in the group of gastric tube fixation was only 4, 5%. Still, prevention is the key and besides diagnostic and repair of simultaneous hiatal hernia when identified, the stomach fixation strategy in LSG is easy to use, safe and can reduce complications arising from improper positioning and gastric tube alterations.

Conclusion: An operative and post-operative protocol that allows new insights into the anatomical behavior of the stomach after LSG was proposed. Routine intraoperative stomach fixation to the pre-pancreatic fascia reduced the rate of postoperative mediastinal migration of the upper sleeve. Further studies are needed to assess the real mechanisms responsible for this complication and the effectiveness of this and other preventive measures.

Disclosure: No conflict of interest declared

Metabolic deficiencies after a restrictive bariatric operation

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Background and Aims: Bariatric surgery has resulted in an effective and long term loss of excess weight in morbidly obese patients with a simultaneous improvement of their metabolic profile. Another aspect of bariatric surgery is the malabsorption of vitamins that requires the administration of supplements. The purpose of this study is to ascertain the incidence of metabolic deficiencies after a restrictive bariatric operation (gastric sleeve or plication).

Material and Methods: Retrospective study of morbidly obese patients that underwent a restrictive bariatric operation in the years 2010–2013. Levels of folic acid, B12, ferritin and serum protein were measured 3, 6 and 9 months postoperatively. Patients with preoperative deficiencies in the above were excluded. 432 patients were included in the study. In cases of deficiency, supplements were administered.

Results: Out of 432 patients, 84 (19.4%) presented with low folic acid levels, 12 (2.8%) low B12, 47 (11%) low ferritin and 25 (5.8%) low serum protein levels. The abnormalities presented mostly at 3 months and tended to improve at 6 and 9 months. 4 cases proved refractory to folic acid administration, 3 to iron administration and 4 cases of B12 deficiency endured, 2 because of patient noncompliance to parenteral administration.

Conclusion: Restrictive bariatric operations are followed by a drop of consumed calories and fat but also by vitamin deficiencies, especially water soluble, to a degree that requires supplementation. It is pending whether it is because of changes to the anatomy and physiology of the GI tract or because of changes in eating habits. In any case the monitoring and support of a dietician is imperative to ensure a balanced diet and a healthy weight loss.

Disclosure: No conflict of interest declared

Comparative study between silastic ring vertical gastropasty and sleeve gastrectomy

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Background and Aims: Silastic ring vertical gastropasty (SRVG) was introduced in Romania in 1997. After 2013 laparoscopic sleeve gastrectomy (LSG) and gastric bypass (RYGB) were introduced at the Second Surgical Clinic from Cluj-Napoca Romania.

Material and Methods: Along 17 years of activity we operated 1366 obese patients with a weight ranging from 105 kg to 187 kg and a BMI between 39.62 kg/m² and 57.17 kg/m², using SRVG in 1111 cases, reconstruction in 93 patients and plastic surgery in 162 subjects. Starting from May 2013 and by January 2016, 79 patients were submitted to LSG. In the same period of time 3 patients were reconverted into LSG and 5 patients into RYGB. In 115 cases previously submitted to SRVG the ring was removed. Biochemical and radiological evaluation were performed at 1, 3, 6 and at 12 months after surgery.

Results: We had good results in 91.15% cases that underwent SRVG. However, the difference between these methods is the “shorter life” of the ring (3–10 years) as compared to LSG/RYGB. SRVG failures were greater. We had 3 cases of gastric fistula and one case of gastric stenosis after LSG. The biochemical evaluation showed significant improvements in both cases of LSG and RYGB.

Conclusion: Both methods have good results (SRVG/LSG). The SRVG lifetime is shorter as compared to LSG/RYGB. Comorbidities and biochemical results have shown improvements in both surgical techniques.

Disclosure: No conflict of interest declared

Conversion from Single Anastomosis Duodeno-Ileal Bypass with sleeve gastrectomy (SADI-S) for malabsorptive issues to none or less malabsorptive procedures.

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Background and Aims: Laparoscopic Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) considered in one stage or two stages is a recent new operation for morbid obesity based on the biliopancreatic diversion. However, some mid-term results suggest that possible malabsorptive complications can appear after this procedure. Thus, a conversion to a less malabsorptive procedure is required or even reversal.

Objectives: This study was designed to describe and analyse the outcomes after laparoscopic conversion to Single Anastomosis Duodeno-Jejunal Bypass with sleeve gastrectomy (SADJ-S) or Roux-en-Y gastric bypass (RYGB), after Single Anastomosis Duodeno-Ileal Bypass with sleeve gastrectomy (SADI-S). Conversion has been proposed as corrective strategy for malabsorptive issues after SADI-S.

Material and Methods: We propose a retrospective analysis of a prospectively kept database.

Results: From January to November 2015, 3 female patients underwent laparoscopic conversion to SADJ-S after SADI-S for presenting with severe protein-calorie malnutrition and multiple nutritional deficiencies. During the follow-up after conversion from sleeve gastrectomy to SADI-S (mean follow-up 26 months) they had all required parenteral nutrition, vitamin and mineral supplements and even hospital admission (one of them requiring admission to the ICU for epileptic status due to metabolic disorders). Preoperative BMI was 24.006 (20.41–27.55) kg/m². None of them experienced relevant postoperative complications, with a mean hospital stay of 4.66 days. Mortality was 0. All patients recovered from their initial condition. However, due to conversion to a less malabsorptive procedure all patients experienced weight regain: mean BMI increase was 7.14 (5–10.79) kg/m²; mean weight increase was 18.89 (11.25–30.9) kg.

Conclusion: Outcomes of laparoscopic conversion to SADJ-S or RYGB after SADI-S are good, showing clinical improvement of malnutrition and nutritional deficiencies in all cases. This technique seems to be feasible and without severe long-term complications. Further investigations are warranted to confirm our preliminary results.

Disclosure: No conflict of interest declared

Short-term results in SG comparing two handling in the staple line

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Background and Aims: SG is the most popular surgery to achieve weight loss in Obesity in Chile. Hemorrhage of the staple line and leakage, are the most challenging problems after SG. To prevent these, reinforcement of the staple line has been proposed. Seamguard has been one of the most common devices for this. Our group has performed this reinforcement using one line of the staple arm, and presented our results. In the last 30 months we stop using this, and make a comparison between the 2 groups, with the same surgical team.

Objectives: Our purpose is compare 2 similar groups of patients, in gender, age, Bmi and comorbidities. One of this with reinforcement with one layer of Seamguard (group A), and the other group only with metallic

clips (Group B), and analyze the results comparing complications in the short term.

Material and Methods: We retrospectively analyze 2 consecutive groups of patients, treated for the same main Surgeons with the same technique with the only difference in both groups concerning to the reinforcement in the staple line. Group A (703 pts) from December 2009 to June 2013 with reinforcement with Seamguard in one arm of the cartridge, and group B (892), from July 2013 to December 2015, without any specific reinforcement. We analyze both groups and compare results in the short-term.

Results: The total serie is composed for 1595 patients. 703 in group A and 892 in group B. Females are 1180 (74%), 81% in group A and 69% in group B. Mean age is 39 yo (14–72). Group A 36yo (15–75) and B 41yo(14–72); Mean BMI is 37.5 (31.5–56), group A 37.2 and group B 37.7. Both groups are similar in associated comorbidities. There was no demonstrated leakage in both groups. Group A presented 0.28% of intra-abdominal collections vs 0.2% of group B. Bleeding underwent 4 patients (0.5%) in group A and 7 pts (0.8%) in group B. Reoperations there was only related with bleeding in 0.25% in Group A and 0.22% in group B. PVT underwent 9 pts in total serie (0.56%), the same proportion in both groups. Other minor complications were 1.4% and 1.3% respectively.

Conclusion: In 2 consecutive similar groups performed for the same team with the same technique, the reinforcement of the staple line in a particular way, do not reduced the bleeding significantly comparing with the group w/o reinforcement, and there was no differences in hospital stay, leakage, intra-abdominal collections and incidence of PTV.

Disclosure: No conflict of interest declared

Table 1.

	Group A	Group B	Total
Patients	703	892	1595
Female/male(%)	81/19	69/31	74/26
age	36 (15–75)	41 (14–72)	39yo
BMI	37,2(31–61)	37,8(32–56)	37,5
Hospital stay	2,4 (1–8)d	2,8 (1–10)d	2,5 d
leakage	0	0	0
abscess	2 (0,28%)	2 (0,2%)	0,25%
bleeding	4 (0,56%) 2 reop(0,28%) 2 med	7 (0,8%) 2 reop(0,25%) 5 med	11 (0,68%)
PTV	4 (0,56%)	5 (0,56)	9 (0,56%)
others	10 (1,4%)	12 (1,3%)	22 (1,3%)
Total morbidity	20 (2,8%)	26 (2,9%)	26 (2,9%)

PO3.037

Personalized exercise prescription: Does it work after bariatric surgery?

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Background and Aims: Morbid obesity is a major contributor to many chronic diseases. Bariatric surgery is considered an effective treatment for severe obesity and its related comorbidities. Meta-analyses demonstrate that post-bariatric surgery patients with high levels of physical activity (PA) experience greater weight loss, reduction of obesity-related comorbidities and improved quality of life (QOL). A study conducted by our multidisciplinary program demonstrated that 60% of post-bariatric surgery patients were unable to maintain recommended PA levels due to perceived barriers. Studies have shown that a physical activity prescription

(PARx) is an effective and practical method to increase PA levels and quality of life in the primary care setting. However, PARx's have not yet been tested in the post-bariatric surgery population.

Objectives: The objective of this study was to examine if a PARx improves PA and QOL in bariatric surgery patients at 6 months and 1 year postoperatively.

Material and Methods: In this prospective RCT, 100 post-operative bariatric surgery participants were randomized to receive either a personalized PARx or the usual care which included general exercise recommendations as reflected by the Canadian Physical Activity Guidelines. The principles behind providing a physical activity prescription also echoed the Canadian Physical Activity Guidelines, but provided the patient with specific, written instructions to increase the intensity, frequency, or duration of activity to meet guidelines. Data was collected at two time points: 6 months and 1 year post-operatively. PA level, QOL, BMI, percentage of weight loss and waist circumference were compared between the two groups using a paired t-test.

Results: Preliminary results will be presented from data collected at the 6 month time point. We will compare PA level, QOL, BMI, percentage weight loss and waist circumference between the two groups using a paired t-test.

Conclusion: The study will enable us to determine if a PARx motivates patient to increase their physical activity, and if that has an effect on long term QOL, BMI, percentage weight loss and waist circumference.

Disclosure: No conflict of interest declared

PO3.038

Can improving post-bariatric surgery constipation rates reduce ER visits and hospital readmissions?

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Background and Aims: Obesity is a worldwide epidemic. Bariatric surgery is an effective treatment for obesity and its related comorbidities. The University of Toronto Collaborative Bariatric Surgery Program in Canada has performed over 2000 surgeries across three sites. Toronto Western Hospital (TWH) is the first Centre of Excellence in Canada to be accredited as a level 1 centre by the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP). This comprehensive interdisciplinary program includes social workers, registered dietitians, pharmacists, psychologists, psychiatrists, surgeons, an internal medicine specialist, and registered nurses and nurse practitioners (NPs). In addition to providing comprehensive care pre and postoperatively, the NPs also take a leading role in research and education to maximize health outcomes in this population.

Objectives: The purpose of this quality improvement program was to evaluate the impact of this innovative SCP on constipation incidence, emergency visits and hospital readmission rates.

Material and Methods: The SCP was implemented at TWH only in January, 2014. Constipation was evaluated with a validated tool at one month post-op. Emergency visits and hospital readmission rates for constipation were extracted from the MBSAQIP database and analyzed at baseline and post-protocol implementation. Data was collected for patients who had surgery at TWH from January 2014 to December 2014. During this time period, data was also collected for patients who had surgery at the other two sites which did not implement this protocol.

Results: Constipation rates at TWH at one-month post-op improved from 51% to 22.6%. Constipation rates at the two other sites did not improve over the same time period. There was also a trend towards decreased ED visits and readmission rates related to constipation.

Conclusion: Standardized bowel routine SCP decreases constipation rates in post-op bariatric patients.

Disclosure: No conflict of interest declared

PO3.039

The Bariatric Network of Veneto Region (VON): A way to improving care through affordability

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Background and Aims: Obesity is extensively plaguing the modern society. The related healthcare costs are soaring and clash with continuous budget constraints. Bariatric practice is basically interdisciplinary and demands dedicated resources and expertise that are mainly institution-related. No local health authority has yet implemented a plan to coordinate the bariatric activity within the administered territory. Regione Veneto has a population of more than 6 x 106 inhabitants and obesity has a prevalence of 9.4%. The Regional Administration is the primary healthcare provider and payor. A regional healthcare plan was approved in 2012. All the health-related activities are delivered through different network of care.

Objectives: There is a solid rationale behind setting a regional/national bariatric network in terms of resource allocation, standard healthcare provision, extensive and appropriate coverage, risk management and costs containment. Moreover such a network promotes research and partnership at large.

Material and Methods: The Network (VON) is based on a “hub and spokes” model, where both hub and spokes centers deliver comprehensive care to obese patients. Hub has also functions of planning and coordination accordingly to local health Authority, referral for spokes and headquarter for research and partnerships programmes. Common pathways of care are shared within the centers of the network. Accreditation as a bariatric Unit/Center is required to enter the network. Inpatient/outpatient activities and outcomes are assessed and recorded according to the Regional Authority requirements. Semiannual audits will be scheduled.

Results: The Bariatric Network was approved by the Regional Administration in 2015. The network at the moment encompasses 2 hub and 5 spoke Centers scattered throughout the Region, the ones with consolidated bariatric practice and facilities. One of the Hubs is also the Regional Referral and Coordination Center for Obesity.

Conclusion: The aim of VON is to deliver the best patterns of care for obese people, in order to improve outcomes, reduce care variability and costs. Longitudinal assessment will provide new insights on the best practices for this setting of patients.

Disclosure: No conflict of interest declared

PO3.040

Bone mineral density and trabecular bone score in ukrainian women with obesity

[no abstract]

PO3.041

Lean Mass And Fat Mass Distribution In Ukrainian Postmenopausal Women With Abdominal Obesity And Metabolic Syndrome

[no abstract]

PO3.042

QT-interval shortening after bariatric surgery depends on the applied heart rate correction equation

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Background and Aims: A shortening of electrocardiographic QT-interval has been observed in obese subjects after weight loss but previous results may have been biased by inappropriate heart rate (HR) correction.

Objectives: To examine to what extent the QT interval shortening depends on the used heart rate (HR) correction equation and how it relates to concurrent metabolic changes.

Material and Methods: Electrocardiography (ECG) recordings of 49 (35 females) severely obese patients before and 12 months after Roux-en-Y gastric bypass (RYGB) surgery were analysed. QTc was calculated by using 4 different equations, i.e. Bazett, Fridericia, Framingham, and Hodges.

Results: Irrespectively of the used correction formula, QTc-interval length was reduced after the surgery (QTc_{Bazett} -28 ± 15 ms; QTc_{Fridericia} -9 ± 12 ms; QTc_{Framingham} -11 ± 13 ms; QTc_{Hodges} -6 ± 12 ms; all *P* < 0.001), but QTc_{Bazett} reduction was significantly greater than the reduction in QTc calculated upon the other 3 equations (all *P* < 0.001). Moreover, changes in QTc_{Bazett} (*P* < 0.001) but not in QTc_{Fridericia}, QTc_{Framingham}, and QTc_{Hodges} (all *P* > 0.05) were significantly correlated with concurrent changes in HR. Multivariate regression analyses revealed a significant independent association of serum insulin levels with QTc_{Fridericia}, QTc_{Framingham}, and QTc_{Hodges} values (all *P* < 0.05) preoperatively, whilst changes in QTc interval length after the surgery were not consistently associated to concurrent changes in metabolic traits.

Conclusion: Our data show that the extent of weight loss-associated QTc-interval shortening largely depends on the applied HR correction equation and appears to be overestimated when the most popular Bazett's equation is used.

Disclosure: No conflict of interest declared

PO3.043

Epidemiological evaluation of the cause of obesity in women who referred to referral bariatric surgery center, Shiraz University of Medical Sciences, Southern of Iran

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Background and Aims: Obesity is a major public health problem which affected peoples living in developing and developed countries. One of the treatment strategy to control morbid obesity is bariatric surgery. Sleeve gastrectomy is a surgical weight-loss procedure in which the stomach is reduced to about 25% of its original size, by surgical removal of a large portion of the stomach along the greater curvature. The aims of this study were to evaluate some epidemiological predisposing factors for obesity that lead or not to lead to surgery in women referred to Ghadir Mother and Child Specialized Hospital, Shiraz, Iran.

Material and Methods: In this retrospective study, we enrolled 647 women with obesity who referred to this hospital from May 2011- July 2015. Data about age, body mass index (BMI), operation, marital status, jobs, education level, previous unsuccessful dietary regimen, cause of referral, onset of weight gain, meals and duration, bingeing and its situation were taken from them by questionnaire.

Results: Among them, 195 patients (30.1%) were operated and the operation rate was 1:2.39. The BMI of operated and non-operated patients were 41.95 ± 6.84 and 42.62 ± 7.47 kg/m², respectively (*P* = 0.284). No significant difference was existed between the age of operated and non-operated patients (36.84 ± 10.42 vs. 36.73 ± 10.56 years, respectively, *P* = 0.905). Only significant relationships were detected between leading to operation and infertility (*P* = 0.036), bingeing (*P* = 0.045), and bingeing after dieting (*P* = 0.032).

Conclusion: In our center, only 3 from each 10 obese women were advised for operation. Other obese women were advised for weight controlling using nutritional and exercise strategies. It seems that infertility is the most cause of operation and between daily habits, having a binge especially after dieting are more lead to operation.

Disclosure: No conflict of interest declared

PO3.044

Postoperative pain after laparoscopic sleeve gastrectomy: Comparison between intravenous analgesia alone or associated with epidural analgesia or with port-site infiltration with local anaesthesia

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Background and Aims: Despite bariatric surgery is actually mainly performed laparoscopically, analgesic optimization continues being essential to reduce complications and to improve the patients' comfort.

Objectives: The aim of this study is to evaluate the postoperative pain after analgesia iv exclusively, or associated with epidural analgesia or port site infiltration with bupivacaine.

Material and Methods: A prospective randomized study of patients undergoing laparoscopic sleeve gastrectomy between 2012 and 2014 was performed. Patients were divided into 3 groups: Analgesia iv exclusively (Group 1), epidural analgesia + analgesia iv (Group 2) and port site infiltration + analgesia iv (Group 3). Pain was quantified by means of a Visual Analogic Scale and morphine rescue needs were determined 24 hours after surgery.

Results: 147 were included. Groups were comparable in age, gender and BMI. There were no differences in complications, mortality or hospital stay between groups. Median pain 24 hours after surgery was 5 in group 1, 2.5 in Group 2, and 2 in group 3 ($p = 0.01$), without statistically significant differences between Groups 2 and 3. In Group morphine rescue was necessary in 18.2% of the cases, 2.5% in Group 2 and 3.6 in Group 3 ($p = 0.009$), without statistically significant differences between Groups 2 and 3.

Conclusion: Epidural analgesia and port site infiltration with bupivacaine, associated with analgesia iv, reduce the postoperative pain, when compared with analgesia iv exclusively.

Disclosure: No conflict of interest declared

PO3.045

Implementation of the Spanish National Enhanced Recovery Programme (ERAS) in bariatric surgery: A pilot study

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Background and Aims: The essence of Enhanced Recovery After Surgery (ERAS) programs is the multimodal approach and many authors have demonstrated safety and feasibility in fast track bariatric surgery^{7,8}. According to this concept, a multidisciplinary ERAS program for bariatric surgery has been developed by the Spanish Fast Track Group (ERAS Spain).

Objectives: The aim of this study is to analyze the initial implementation of this Spanish National ERAS protocol in bariatric surgery.

Material and Methods: A multi-centric prospective pilot study was performed, including 125 consecutive patients undergoing bariatric surgery at 3 Spanish hospitals between January and June 2015, following the Spanish National ERAS protocol in bariatric surgery. Compliance with the protocol, morbidity, mortality, hospital stay and readmission were evaluated.

Results: Bariatric techniques performed were 68 RYGB (54.4%) and 57 LSG (45.6%). All of the surgeries were laparoscopically performed with conversion in only 1 case (0.8%). Median postoperative pain evaluated by Visual Analogic Scale 24 hours after surgery was 2 (range 0–5). Post-operative nausea or vomits appeared in 7 patients (5.6%). Complications appeared in 6 patients (4.8%). Reoperation rate was 4%. Mortality rate was 0.8%. Median hospital stay was 2 days (range 2–10) and readmission rate was 2.4%. The overall compliance to protocol was 83.6%.

Conclusion: The Spanish National ERAS protocol is a safe issue with a high implementation rate. It can be recommended to establish this protocol to other institutions..

Disclosure: No conflict of interest declared

PO3.046

Health-related quality of life, sexuality and hormone status after bariatric surgery.

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Background and Aims: The hormonal balance is affected by body fat distribution but also of liver function. These factors play a role in sex hormone-binding globulin (SHBG) synthesis, and post-operative production could change and affect the serum concentration of hormones. One sees low levels of SHBG are already in obese individuals, with higher levels of free androgens and estradiol. Although decreased levels of LH and FSH are seen in the obese, a further shift of the levels during the menstrual cycle also occur compared to normal weight (Sarwer et al, 2012; Turcato et al, 1997; Tchernof et al, 1999 & 2000). There are very few studies of sexual quality of life after gastric bypass. Three previous studies have been conducted with a similar focus, Bond et al 2006, 2009 and Kolotkin 2006. These articles have focused on the qualitative aspect of sexual life postoperatively, and used the questionnaire-based data in their analysis. We intend to complement this research with a focus on hormone levels. Our purpose with this study is to characterize the hormonal status in fertile women undergoing laparoscopic gastric bypass, preoperatively and twice postoperatively. Correlates (Health Related Quality of Life (HRQOL) with hormone levels in women after gastric bypass? We plan to compare data from hormonal studies with results from HRQOL questionnaires. Our hypothesis is that women who have undergone gastric bypass will have altered hormone levels and that this can affect the quality of life and sexual life.

Material and Methods: The study includes fertile women between 18–50 years who undergo surgery with the laparoscopic gastric bypass primary. Exclusion is smoking, liver disease and hormone medication. We intend to study the hormonal status in 120 women by measuring lutein hormone (LH), follicle stimulating hormone (FSH), estradiol, testosterone, progesterone, albumin and SHBG preoperatively, 6 weeks postoperatively and a year postoperatively. The study is primarily descriptive. 120 patients are included and data collection is ongoing. The 120 participants will be asked to complete three different forms: A general form of health-related quality of life Psychological General Well-Being (PGWB); a hormonally-related quality of life questionnaire, the Women's Health Questionnaire (WHQ) and a sexuality forms, Female Sexual Function Index (FSFI). The forms must be completed preoperatively, 6 weeks postoperatively and 1 year postoperatively. Data analyzed for correlation and regression models. All 120 participants are included and data collection is in progress.

Results: Analysis of data is ongoing and preliminary statistical analysis for approximately 60 participants will be available prior to poster presentation. The 1-year follow-up for all 120 participants should be finalized in about 6 months.

Conclusion: The planned study is performed to better clarify the hormonal changes that are believed to occur after a gastric bypass surgery, and to see if there is a correlation to changes in quality of life. Infertility is a concrete consequence of obesity that can be improved by weight loss and stabilizing hormone levels. The findings in this research may affect the in-

dications for gastric bypass and possibly treatment options for infertility. In summary, these studies provide an in-depth knowledge about the obesity itself and the gastric bypass operation impact on the body's endocrine balance in particular, and elucidate whether there is a connection to the perceived quality of life.

Acknowledgement: Many thanks and appreciation to my chief research advisor Dr Mikael Wirén, and assisting advisors Drs Jessica Frisk and Ellen Andersson.

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Disclosure: No conflict of interest declared

PO3.047

Metabolic profile in obese patients: The bariatric surgery impact

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Background and Aims: Abdominal obesity is associated with an increased risk of coronary heart disease, in part due to a chain of systemic disorders starting with insulin resistance and including: atherogenic dyslipidemia (high triglycerides and low HDL cholesterol), raised blood pressure and raised fasting plasma glucose.

Objectives: Our objective was to evaluate the metabolic syndrome parameters in obese patients before bariatric surgery and 6 months after the procedure.

Material and Methods: Between July 2013 and December 2014, 60 patients (35 females and 25 males, mean age 39.1 ± 9.1 years) with mean BMI 43.5 kg/m² ± 7.9 were enrolled. The metabolic syndrome parameters were evaluated in all patients before and 6 months after the metabolic surgery procedure. Weight loss was significant 6 months after surgery with average EWL of 31,2%.

Results: Mean triglycerides value at baseline was=136 mg/dl vs 113 mg/dl 6 months after bariatric surgery (reduction of 16,9%); high level of triglycerides > 150 mg/dl at baseline were found in 46,2% of patients vs 26,3% 6 months after bariatric surgery; Low levels of HDL- cholesterol (< 40 mg/dl in men) were identified in 75,86% at baseline vs 33,33% 6 months after bariatric surgery and (HDL<50 mg/dl in women) in 87,5% of the patients vs 60% 6 months after surgery. Fasting glucose levels > 100 mg/dl was found in 51,4% of the patients.

Diagnosis of T2DM was present in 41,1% of the patients . 6 months after surgery all the patients in our lot had fasting glucose levels 100.

Conclusion: The high prevalence of the metabolic syndrome in obese patients offers an additional indication for bariatric surgery, as the metabolic profile for these patients is significantly improved after bariatric surgery. This study confirms the existing data on the benefits of the metabolic surgery procedures as the most effective therapy for T2DM and atherogenic dyslipidemia.

Disclosure: No conflict of interest declared

PO3.048

Are we there yet? – nutritional interventions' insights after gastric sleeve

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Background and Aims: Bariatric procedures are currently regarded as the most effective treatment for severe obesity. However, after surgery, the overall longterm patients' wellbeing depends on daily adequate macro- and micronutrient supply. Patients' understanding and applying dietary recommendations has been shown to be challenging. Our papers' aim is to discuss a series of particular cases regarding nutritional management after gastric sleeve.

Material and Methods: we had chosen three particular types of patients who have undergone LSG. Patient 1: woman with ovo-lacto-vegetarian diet, having vitamin B12 and mild serum albumin deficiency. Patient 2: 18 year old young woman, having transient emotional outbursts, low self-esteem and mild difficulties in relating. Patient 3: 43 year old woman, experiencing significantly impaired joint mobility from gonarthrosis, with a firm weight loss indication before arthroplasty.

Results: Patient 1: alternative protein sources and supplemented B12 vitamin had to be added to in patients' diet, with respect to her personal choices; patient 2: in addition to regular nutritional advice, augmented attention regarding psychological approach has been offered; patient 3: considering limited physical activity, an adapted low calorie diet has been prescribed. Having performed these interventions a desired outcome was observed in all these three patients.

Conclusion: Further efforts should focus on support tools enabling a unified, nevertheless tailored strategy for the bariatric patient. These cases confirm that collaborative approach is of paramount importance in obtaining the desired results along with maintaining maximal safety conditions.

Disclosure: No conflict of interest declared

PO3.049

The influence of 10-week training program on physical ability parameters in bariatric patients

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Background and Aims: A positive relation between physical activity (PA) and pre-bariatric surgery weight loss requirements has been depicted. However, currently there are no evidence-based pre-operative physical activity guidelines for morbidly obese patients. Our cross-sectional observational pilot study aimed to evaluate the magnitude of differences that can be elicited by simple community based exercise regimen in bariatric patients. There are also limited data about the physical abilities in this population and some of the tests used in the previous studies tend to underestimate the true physical abilities of those patients.

Material and Methods: Eleven bariatric patients aged (4 males and 7 females; age range 30–54 years) volunteered to participate in the study that was approved by The National Medical Ethics Committee of the Republic

of Slovenia. Patients with cardiopulmonary disease and functional limitation were excluded from the study. Training program (pre-operative intervention) was developed at the Faculty of sport in Ljubljana and included 2 weekly aquatic trainings at the University swimming center and 2 additional weekly training sessions combining aerobic and strength exercises that were mainly performed in the natural environment surrounding the faculty proximity under the supervision of the kinesiology's. Physical ability testing was performed prior and after the intervention and included BIA body composition (InBody 720), handgrip strength testing (Noraxon MyoTrace 400), raising from a chair test in 30 seconds, YMCA bench press and one leg stance test. Systolic and diastolic pressure was measured on a testing day following a 10 minutes rest. Data were processed using SPSS for Windows (ver 21.0; SPSS Inc, Chicago, IL). T-test for pair samples was used to compare the pre and post intervention results. A significance level of 0.05 was used for all tests.

Results: Main characteristics of male and female bariatric patients upon enrollment into study are shown in Table 1.

Table 1. Basic characteristics of male and female bariatric patients

Parameter	Males (4) Mean (Std. Dev.)			
Body height in cm	182,10*	8,73	164,64	7,13
Body mass in kg	136,08	12,32	115,76	26,08
Percentage body fat	37,93*	9,26	50,51	3,95
Body mass index	41,48	7,79	42,37	7,59

* - significant difference between sexes

The influence of 10 week training program is depicted in Table 2.

Table 2. The influence of 10-week training program in physical ability parameters in bariatric patients

Body mass	125,84	24,39	121,8	24,16	-3,21%	0,068
Skeletal muscle mass	37,85	9,08	37,7	9,11	-0,40%	0,846
Body fat percentage	46,43	8,45	44,73	8,81	-3,66%	0,001
Body mass index	42,98	7,65	41,63	7,56	-3,14%	0,084
Bench press	33	12	35	15	6,06%	0,344
Chair raises	15	2	17	2	13,33%	0,001
Handgrip DOM	339	117	405	122	19,47%	0,007
Handgrip NDOM	326	94	375	101	15,03%	0,000
One leg stance right	80	44	83	49	3,75%	0,620
One leg stance left	72	46	79	48	9,72%	0,201
Systolic pressure mmHg	131	8	129	12	-1,53%	0,479
Diastolic pressure	92	12	84	7	-8,70%	0,043

The results presented in Table 2 demonstrate positive effects of physical activity alone as patients nutritional habits were not clearly followed after nutritional consultation. However, general consultation of increased protein and lower carbohydrate consumption was advised. The loss of body mass was around 3% ($p > 0.05$) but there was a significant decrease of body fat percentage that probably correlates the best with the body mass change. Among physical ability parameters, highly positive effects were observed in the handgrip strength and chair rises in 30 seconds. The significant decrease of diastolic pressure was observed due to physical activity.

Conclusion: Our pilot study has shown that bariatric patients do benefit in the terms of physical ability and body composition following a simple community based exercise program. Database with suggested tests of physical abilities should be created along with the test normative values in order to combine results from different studies. Training programmed in morbidly obese patients must be supervised. This study was used as a pilot for a larger randomized controlled trial in bariatric patients. Our results strongly suggest individual nutritional support for optimization of metabolic needs.

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Disclosure: No conflict of interest declared

PO3.050

All the surgeons should know about obstructive sleep apnea and bariatric surgery

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Objectives: Obstructive Sleep Apnea (OSA) is more prevalent in obese population. Bariatric surgery (BS) is an effective method to reduce and maintain weight loss, an important step in OSA therapy. The aim of this presentation is to assist practitioners to deliver effective and save medical care.

Material and Methods: All the obese patients are investigated for OSA. BS is recommended for obese OSA with BMI > 35 kg/m², with pre-operative treatment of 6–8 weeks with CPAP and follow up after BS. Post-surgical reevaluation should be at 1, 3, 6 months and 1 year.

Results: In a recent meta-analysis of 13.900 patients who underwent BS, 79% of them had either resolution or improvement of OSA. In a prospective, multicentre observational study of patient undergoing BS, complications occurred in 4,1% this included 0,3% mortality. Patients more likely cured of OSA were less morbidly obese and younger. Patients should repeat polysomnograms after BS and those patients with residual OSA, must be treated with CPAP. The metabolic improvements that accompany weight loss (by BS and dietary means) may be maximized if OSA is also treated by CPAP.

Conclusion: Ongoing diet and behavioral programmes are necessary to maintain initial dramatic weight loss achieved by BS. No clear guidelines exist upon which to base the recommendations for retesting for OSA following BS. Patients after BS with regain of weight, a history of previous OSA, must be retesting for OSA.

Disclosure: No conflict of interest declared

PO3.051

Psychological consequences of massive weight loss after bariatric surgery

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Background and Aims: Bariatric surgery has proved to be the most effective treatment method for obesity and its comorbidities. However complex of psychological issues may arise after extreme weight loss induced by surgery. The multidisciplinary team approach firstly helps to deal with psychosocial and psychopathological components related to severe obesity and secondly assists individuals who decided to deal with their disease in long-term.

Objectives: Higher prevalence of psychological distress, unrecognized presurgical mood and anxiety disorders or childhood trauma survivorship are in direct correlation with obesity level (BMI) and bariatric patient status.

Results: Obesity and food might stand as stabilizing factors despite low levels of individual satisfaction. Weight loss and psychosocial changes after bariatric intervention may trigger mental destabilization, as certain problems can persist or even elevate after surgery. Uncovering of emotional problems which underlie obesity may result in increase or new onset of substance abuse in 13,3% (Ivezaj V. 2014), psychiatric hospitalization, antidepressant use or 2- 3 times higher rate of suicidal attempt (Sarwer DB. 2014). The most vulnerable period is about 2 years after surgery (Hayden

MJ. 2014, Odom J. 2010), during weight loss plateau and regain, or after excessive and rapid weight loss.

Conclusion: Higher frequency of follow-up visits may help to mitigate and prevent risks of psychological distress which may result into serious mental issues and weight regain. This is especially important in patients suffering from gross psychopathology who are in substantially greater need for follow-ups. It's important for a patient as well as for a professional to recognize when to reach the psychological or psychiatric support.

Disclosure: No conflict of interest declared

PO3.052

Liver of morbidly obese patients undergoing bariatric surgery fails to activate antioxidant response in early phases of NAFLD-NASH progression

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Background and Aims: NAFLD is the more frequent liver disease found in morbidly obese patient. Although the mechanisms are not entirely clear, the level of oxidative stress is believed to be correlated with NAFLD progression towards cirrhosis. A pivotal role in the cytoprotection is exerted by the antioxidant enzyme NAD(P)H:quinone oxidoreductase (NQO1), whose expression is controlled by the transcriptional activator E2-related factor 2 (NRF2). The correlation between hepatic NQO1 levels and NAFLD progression has been investigated only in few studies in steatotic patients, but, to date, the literature lacks data on morbidly obese. A better understanding of the status of antioxidant pathways in the liver could improve the postoperative management of NAFLD in obese patients. The aim of this study was to investigate the correlation between NQO1 expression and the grade of NAFLD progression in the sub-population of morbidly obese patients.

Material and Methods: Slides from eleven wedge hepatic biopsies, performed during bariatric surgery, were scored according to the NAFLD Activity Score (NAS) by a medical pathologist. Masson's trichrome stain was used for fibrosis staging. Immunohistochemical or immunofluorescence for NQO1 and NRF2 were performed as double staining on the same slide or on serial sections. The intensity of NQO1 and NRF2 cytoplasmatic-stain and the number of NRF2-positive nuclei were evaluated according to pathological findings.

Results: The NAS score was between 2 and 7, with a fibrosis score up to 2. The double immunofluorescence revealed a weak stain for NQO1 and very few NRF2-positive hepatocyte nuclei, despite the high amounts of the cytoplasmic protein. Nor nuclear NRF2, neither the NQO1 expression correlates with NAS grade. There was a weak positive correlation between nuclear NRF2 and fibrosis stage. Results from immunohistochemistry, also showed more NRF2-positive nuclei close to portal tracts or in areas of increased fibrosis, than in steatotic areas.

Conclusion: Morbidly obese patients with NAFLD may have a different cytoprotective response to the oxidative stress, respect to non-obese patients, indicating that this sub-population of patients may need a specific therapeutic approach to manage NAFLD.

Disclosure: No conflict of interest declared

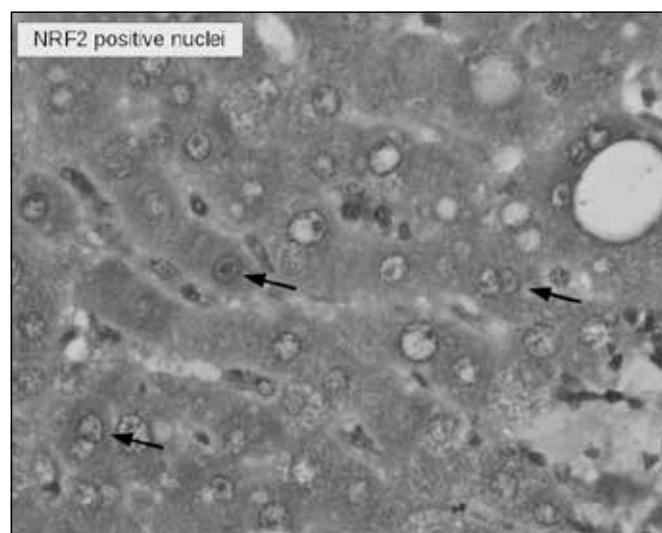


Fig. 1.

PO3.053

Perioperative Management Protocol for Obstructive Sleep Apnea in a High Volume Centre Of Excellence For Bariatric And Metabolic Surgery

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Background and Aims: In morbidly obese patients with OSA undergoing surgery the likelihood of respiratory complications occurring after surgery is increased. Preoperative CPAP reduces the negative cardiopulmonary physiological consequences and the possible complications. The aim of this study was to develop a reliable protocol for the management of significant OSA in bariatric patients.

Material and Methods: With institutional Ethics Committee approval and signed informed consent we prospectively studied 1357 consecutive patients scheduled for laparoscopic bariatric surgery in our center, between January 2013 –December 2015. All the patients assessed by anaesthetist with a STOP BANG score >4 were investigated with portable Polysomnography at home. The patients with moderate severe OSA defined as an Apnoea / Hypopnoea Index (AHI) of 20 or greater received treatment with autoCPAP 2–4 weeks preoperatively. Before scheduled day of surgery we evaluated the patients compliance with CPAP. The data monitoring system recorded mean daily use (h), percentage of days on which CPAP was used, percentage of days on which PAP was used for >4 hr and AHI. The adequate compliance was considered as PAP usage of >4 hr per night for 70% of days.

Results: Out of 340 patients with PSG at home, 226 patients (66%) with AHI >=20/h were diagnosed with significant OSA and ended up treated with CPAP. 129 patients (57%) were considered compliant with CPAP. The statistical analysis was performed with SPSS version 22. For all the patients we used an OSA safe anaesthesia technique and all the non compliant patients were admitted postoperatively in HDU for 24 hours with serial monitoring of blood gases and noninvasive ventilation. The compliant patients continued their CPAP postoperatively with monitoring of SpO2 for 24 h. (attachment).

Conclusion: Positive airway pressure is the most effective treatment for obese patients with moderate-to-severe OSA undergoing surgery. Because compliance with CPAP treatment is suboptimal an adequate postopera-

tive care may significantly reduce the potential cardio-respiratory complications.

Disclosure: No conflict of interest declared

Descriptive statistics		
Number of patients 1357		
Variable	Median	Interquartile Range
Age	42.000	15.000
BMI	41.400	8.810
Height	170.000	14.000
Waist Circumference (cm)	128.000	23.000
Hip Circumference (cm)	128.000	18.000
Neck Circumference (cm)	43.000	8.000
Stop Bang Score	4.000	3.000
SpO2 baseline	.970	.020
Lean Weight (kg)	57.390	19.740
Fat Mass (kg)	57.960	20.040
Trunk Fat (kg)	33.460	13.510
Neck Fat (g)	1250.000	576.500
Lean Neck (kg)	2.200	.960
Expiratory reserve volume (L)	40.900	39.780
ABSI	.083	.006
Waist hip ratio	.990	.150
Weight (kg)	121.850	32.930
dxOSA score	1.000	3.000
aoSA score	2.000	2.000
Variable	%	
With Diabetes	17.92	
Male	38.72	
Female	61.28	

Fig. 1

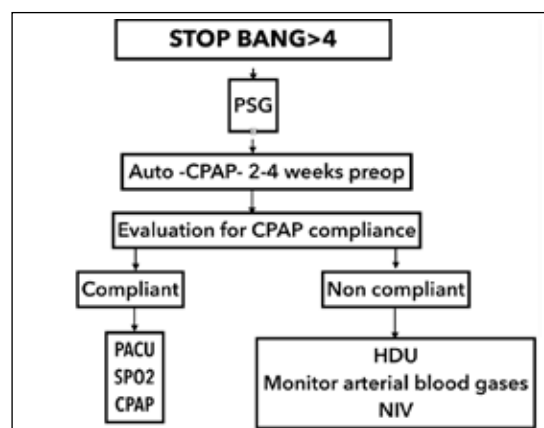


Fig. 2

PO3.054

Attitudes towards and knowledge about metabolic surgery among internal medicine and family physicians in the Czech republic: We Can Do Better.

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Background and Aims: Recent evidence on bariatric and metabolic surgery (BMS) in the treatment of type 2 diabetes (T2DM) allow physicians to screen appropriate candidates and to share the decision making.[1,2]

However, it is not known whether physicians have the attitude and capacity to recognize a good candidate for BMS and offer shared decision making (SDM) regarding BMS [3,4].

Objectives: To assess the attitude towards BMS and ability to apply evidence and interdisciplinary guidelines on BMS[2] among physicians routinely caring for BMS candidates in the Czech republic.

Material and Methods: At two local conferences on T2DM, we personally asked physicians to answer a written questionnaire. Questions included decision on indication for BMS and knowledge of efficacy and safety of sleeve gastrectomy in context of a patient vignette.

Results: Of 72 physicians interviewed, 9 refused to participate and 15 did not return the sheet. We received 47 answers, of which 23 were totally complete. Responders were certified in internal medicine (15/47), family physicians (14/47), diabetologists (9/47), and other specialists (5/47). 20/47 respondents considered they "had enough information on BMS". 8/47 respondents chose BMI of 30 as the cutoff for indication of BMS in a patient with T2DM. In a case meeting the guideline requirements for BMS, 15/47 respondents would indicate the patient for BMS. 8/47 respondents provided more than 4 precise estimates on 7 outcomes we considered highly relevant for SDM.

Conclusion: A majority of our respondents did not have enough information on BMS to recognize best candidates for BMS and allow SDM regarding BMS. Educating physicians on the risks, benefits, and predictors of outcome of BMS may lead to better allocation of BMS to candidates that can benefit the most from this powerful treatment option.

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PO3.055

Bariatric Psychology, psychological care in Bariatric Surgery

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Background and Aims: The complexity of morbid obesity needs an interdisciplinary team of specialists. Psychology is one of the disciplines in a bariatric team. In the Obesity Centre Eindhoven, the Netherlands, seven psychologists are fulltime dedicated to bariatric surgery. They are working together with, among others, surgeons, nutritionists, bariatric nurses, nurse practitioners, physician assistants and plastic surgeons. Knowing that more than 30% of the morbidly obese patients have a DSM-IV classification (mostly eating disorder, anxiety disorder, mood disorder, or personality disorder), that there is a linear relationship between degree of obesity and psychopathology, that morbid obesity is partly a behaviour problem, and that compliance is related to psychosocial factors, justifies psychological care. Unfortunately, bariatric surgery is not successful for all patients and there can be postoperative problems in eating behaviour (eating bigger portions, loss of control, emotional eating), body image (weight regain, feeling fat, excess skin), psychological functioning (identity crisis, disappointment, depression), relationship (sexuality, jealousy, divorce), and social functioning (anxiety, hostility, anger). As a result, 25% of postbariatric patients opt for postoperative psychological treatment. In our Obesity Centre, based on the guidelines of the Dutch Association of Bariatric Psychologists, we provide preoperative and postoperative psychological care. Preoperative care consists of psychological screening and treatment, to prepare patients for the operation. Postoperative care

consists of psychological monitoring and treatment of unwanted results. When indicated, psychologist screen patients who opt for postoperative body contouring surgery and offer necessary treatment. Mostly, psychological treatment consists of cognitive-behavioural therapy, is protocolled, and evidence based; treatment modules are self-control, eating disorders, self-esteem/body image, and anxiety and mood.

In this presentation, psychological care in an interdisciplinary team will be outlined in detail.

Disclosure: No conflict of interest declared

PO3.056

Effects of laparoscopic sleeve gastrectomy, with or without antrum preservation, on quality of life: A randomized study

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Background and Aims: The exact consequences of antrum preservation in bariatric surgery is still unknown in many aspects. Quality of life, in this sense, is relatively poorly studied.

Objectives: Regarding this, we compare the effects of antral preservation or not on Quality of life in patients undergoing Sleeve Gastrectomy.

Material and Methods: Prospective study with two randomized groups according two distances at the initial section of LSG (3cm and 8cm from pylorus); 30patients/group. Quality of life questionnaire (Moorehead-Ardelt Quality of Life Questionnaire II) was used. This questionnaire explores six areas: esteem, physical ability to develop activities, desire for social relationships, ability to do the job, sex and patient attitude with food. Each section provides a score of -0.5 to +0.5 points.

Results: When comparing the scores obtained 3 months after surgery in both groups, they show a significant increase in all questions from base-line values. 6 months after (3cm group), it significantly increased the score in four questions, while in 8 cm group only increases in one question (laboral activity). At 12 months, both groups significantly increase scores on all sections of the test. 3 cm group: from a score of -0.74 ± 1.33 points before surgery, classified as reasonable, to 2.04 ± 0.67 points at 12 months, classified as good. 8 cm group: from a score of 0.87 ± 1.30 points before surgery, classified as reasonable, to 1.94 ± 0.70 points at 12 months, classified as good. Before surgery (3 cm), 40.0% of patients had a poor or very poor quality of life, while at 12 months no patient was in those categories: 96.7% of patients had a good or very good quality of life. In contrast, in 8 cm group, a 43.4% of patients had a poor or very poor quality of life at the beginning, while at follow-up, no patient was in those categories, and also a 83.4% of patients had a good or very good quality of life.

Conclusion: Quality of life increases significantly after Sleeve gastrectomy in both surgical groups. No differences between two groups were found, considering that this is a test that assesses only "external" aspects. More physiological aspects, as the depositional behavior, are not taken into account.

Acknowledgement: To patients of the study, for their voluntary participation.

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Disclosure: No conflict of interest declared

PO3.057

The psychological approach to the obese person who prepares for the bariatric surgery

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Objectives: To assess preoperatively patients who are candidates for bariatric surgery

Material and Methods: Subjective emotional evaluation, behavioural assessment, normal personality assessment, the mental health assessment as a precondition for the bariatric surgery for 140 consecutive patients

Results: Subjective emotional evaluation, behavioural assessment, normal personality assessment, the mental health assessment as a precondition for the bariatric surgery. By means of the psychological evaluation of the obese patients at high risk of comorbidity, I have monitored: the motivation to lose weight, the presence of emotional factors that contributed to the onset of the suffering, the presence of some predisposing pathogenic risk factors, nutritional habits, the presence of previous unsuccessful attempts at dietary change, The hereditary component, the presence of disorders associated with obesity, the determination of the anxiety level (state/trait) of the obese patients, the assessment of certain personality traits such as: extraversion, introversion, neuroticism, stability, the assessment of the quality of the physical and mental life of obese patients, the assessment of the self-esteem of obese patients, the perception of the self-image, the reduction of emotional tension during the pre-surgical period, the examination of the level of interpersonal networking/bonding (couple, family), family support. Psychological Intervention:

- health education, the promotion of health and of a healthy lifestyle;
- psychological counselling, not only for the patient but for her/his husband/wife as well
- relaxation techniques, optimization and personal development, self-knowledge, mental regulation and self-regulation;

Individual and group psychotherapy

The patients are monitored and they are provided with psychotherapeutic support periodically.

Conclusion: The lack of the ability to make a decision in a responsible way, to react efficiently when dealing with a task, addictions and the presence of some mental disorders are variables which did not allow us to give consent to the bariatric surgery, out of 140 people, 13 were not given the consent.

Disclosure: No conflict of interest declared

PO3.058

The impact of eating disorders on body mass and type 2 diabetes mellitus compensation in obese patients treated with different approaches to therapy

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Background and Aims: To assess the relationship between different types of eating disorders and glycemic control along with weight loss in T2DM/obesity patients that have undergone the insertion of intragastric balloon (IGB) therapy and T2DM/obesity patients that have received therapy by glucagon-like peptide-1 (GLP-1) receptor agonists.

Material and Methods: The study involved 28 patients (9 men and 19 women aged 48 ± 7.1) with T2DM and obesity ($BMI > 35 \text{ kg/m}^2$). IGB („MedSil“ Russia) was inserted in 16 patients, and the subcutaneous injection of GLP-1 was administered to 12 patients. In pursuance of DEBQ (Dutch Eating Behavior Questionnaire), assessment was made of the respective types of eating disorders observed. Initially and over a period of 24 weeks, the anthropometric parameters were measured, BMI with %EWL calculated, measurable facts determined as relating to T2DM compensation (HbA1c) through affinity chromatography method, and plasma glucose analyzed by means of glucose oxidase method.

Results: In the IGB group, five patients had a single type of eating disorder: restrained [20% (n = 3)] or external [13.3% (n = 2)], and ten patients had a mixed type [66.7% (that is, 2 or 3 out of those possible)]. In the GLP-1 group, 4 patients had a restrained type (36.4%) and 7 patients had a mixed type (63.6%). Due to the poor tolerability of treatment, one patient had to have his IGB prematurely removed, and one had to stop receiving GLP-1. After 24 weeks, all groups saw a statistical reduction of BMI ($p < 0.05$), %EWL ($p < 0.05$), HbA1c ($p < 0.05$). There was no statistical differences in either of the two groups in terms of enhanced anthropometric data or parameters of glycemic control. However, the IGB patients with mixed eating disorders have a statistically significant better results on %EWL= 26.0 ± 14.9 and BMI= 5.5 ± 2.5 in comparison the patients receiving aGPP1 therapy – %EWL = 13.5 ± 3.1 ($p = 0.015$), BMI and $3.04 \pm 0.8 \text{ kg/m}^2$ ($p = 0.008$).

Conclusion: Patients suffering from T2DM and obesity must be assessed for their type of eating disorder to select a more effective treatment options. The IGB therapy may well be our choice in the treatment of such patients with a mixed type of eating disorder.

Disclosure: No conflict of interest declared

PO3.059

Obesity and metabolic syndrome retrospective cohort studies of laparoscopic adjustable banding vs medical treatment – three to seven years after surgery

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Background and Aims: Most of the studies have shown the effectiveness of bariatric surgery on metabolic syndrome in less than three years after surgery, while few studies shows its long term benefit. we present three observational long term studies, comparing metoabolic effect of gastric banding with non surgical diabetic patients.

Material and Methods: We analyzed three groups of diabetic patients. All groups are morbidly obese patients with type-2 DM after laparoscopic gastric banding differed by follow up length. We used a questionnaire which included data on weight, lipid profile, fasting glucose, hemoglobin A1C, blood pressure and treatment before and after surgery. The first group includes 79 patients followed for 3 ± 2 years after surgery, second group 70 patients followed for 5.13 ± 0.85 years after surgery and the third group 97 were followed for 6.78 ± 0.97 years after surgery. Their mean age is 46.9 ± 9.8 , 55 ± 9.9 and 56.3 ± 9.7 years old with mean BMI of 44 ± 7.6 , 43.7 ± 5 and 44.1 ± 5.6 with respect to the mentioned groups. Patients had type-2 DM on the average 5.8 ± 4.1 years before the operation. Their mean HB A1C was 7.7%, 8.7g% and 8.4g% in all groups respectively. The last group was compared with a control group (101 patients) who had diabetes without surgery for ten years.

Results: Mean BMI reached 33.0 ± 5.7 in the first group and 31.16 ± 4.8 in both the second and third group. HB A1C declined to $6.2 \pm 1.4\%$, 6.6 ± 1.1 and 6.5 ± 1.2 in all groups respectively. There was 44% and 78% reduction in oral antidiabetic and insulin treatment respectively. While the diabetes has been aggravated during ten years of follow up in the non surgical group , more than 40% had still total remission following 7–10 years after surgery.

Conclusion: Gastric banding is an effective treatment for Type 2 diabetes mellitus enabling very efficient long term remission. The remission is proportionate to BMI decline showing that obesity and metabolic syndrome are different phases of the same process.

Disclosure: No conflict of interest declared

PO3.060

Laparoscopic band-separated mini-gastric bypass: A case report

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Background and Aims: Laparoscopic gastric bypass has been gold standard for the treatment of morbid obesity, but very expensive in developed countries.

Objectives: The aim of this study was to case report of a method of laparoscopic band-separated mini-gastric bypass without the use of cutting-suturing devices for reduce operating cost.

Material and Methods: PatientA 34-year-old female, BMI= 39 (height 164 cm, weight 105 kg). Comorbidity: Osteoarthritis.Surgical Technique: An adjustable low pressure gastric band “Medsil” retracted through retrogastric tunnel. With the use of atraumatic grasper displace the front wall of the stomach below the band in the upward direction through the ring band (Fig.1). For prevention band erosion of jejunum and separation stomach, we use gastro-gastric sutures and that placed to create a gastro-gastric plication around the band. The next step – measured the jejunal loop, at about 200cm from the ligament of Treitz. In finale create handsewn anastomosis between gastric pouch and jejunal loop.After surgery for 3–4 days check for leaks the anastomosis and gastro-gastric impermeability using a water-soluble contrast (Fig.2)

Results: We present a case of laparoscopic gastric bypass without the use of cutting-suturing devices.Earlier using a combination of gastric banding and gastric bypass had the following disadvantages: band erosion of stomach and jejunum. The separation of the stomach to the small and the big part of it was not sealed. In this case the use of a low pressure band and gastro-gastro sutures on bands prevented these complications. We reduce operating costs, approximately \$2000. After two months postop the patient lost weight by 14 kg. This indicator is comparable to the standard method.

Conclusion: Laparoscopic band-separated mini-gastric bypass in a case without the use of cutting-suturing devices is feasible, safe and cheaper standard method.

Acknowledgement: Ethical and governance approvals

All necessary ethical and governance approvals were obtained from the Ethics Committee of the Astana Medical University (No. 7. 17.07.2015).

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Disclosure: No conflict of interest declared

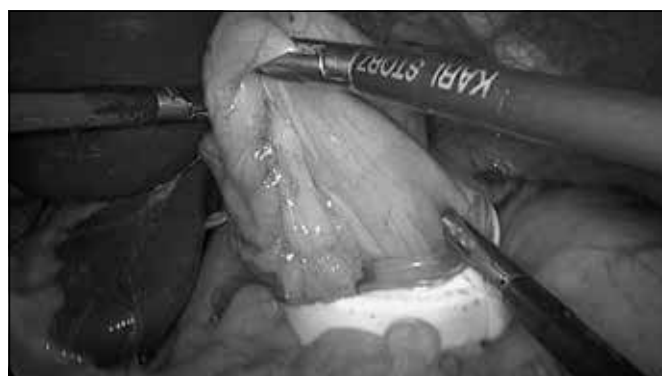


Fig. 1

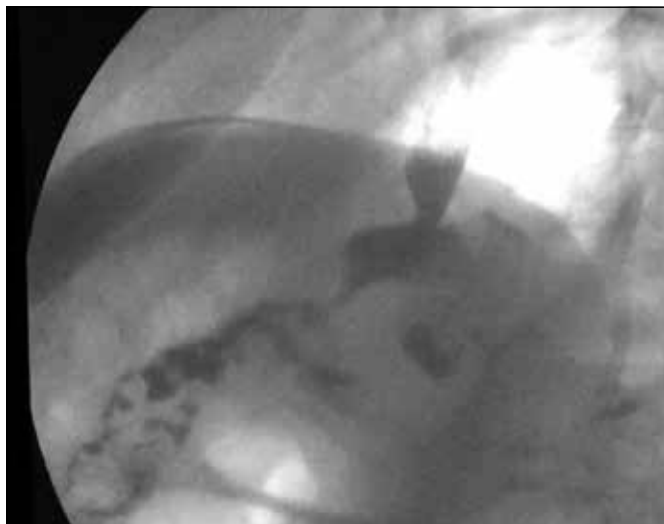


Fig. 2

PO3.061

Sleeve gastrectomy combined with the simplified Hill procedure. The key against postbariatric gastro-esophageal reflux disease?

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Background and Aims: Laparoscopic sleeve gastrectomy (LSG) provides excellent and similar outcomes to gastric bypass, except for gastro-esophageal reflux disease (GERD). Our aims are to present a novel technique which addresses morbid obesity and GERD simultaneously by combination of LSG and simplified laparoscopic Hill repair (sLHR) and to report its short-term results.

Material and Methods: Study design: analysis of LSG+sLHR patients including pre-operative demographics, GERD status, protonpump inhibitor (PPI) use, body mass index (BMI), excess BMI loss (EBMIL), complications, satisfaction and GERD-health related quality of life questionnaire (GERD-HRQL) at >5 months post-operatively. Surgical technique (Figure): posterior closure of the esophageal hiatus, LSG, mobilization of the distal esophagus to the abdominal cavity and fixation of the esophago-gastric junction to the median arcuate ligament at the level of the crural confluence and probing the patency of the esophago-gastric junction with a 36-Fr bougie.

Results: Fourteen patients underwent LSG+sLHR, 12 women/2 men. Mean age was 47 years (27–57), BMI 41kg/m² (35–65). Five patients had gastric banding (GB), two already had GB removal. All had symptomatic GERD, 2 with chronic cough and 10 took PPI daily. Twelve had hiatus hernia and 2 a patulous cardia at surgical exploration. Associated interventions were 3 GB removals and 1 cholecystectomy. Postoperative complication was 1 surgical site infection. Follow-up of all patients at median 7 months (5–10): symptomatic GERD 0/14 patients, chronic cough 0/14, daily PPI usage in 4/14, mean EBMIL 54% (20–121). Satisfaction 100%, mean GERD-HRQL score 1,78/50 (0–10), with 5 patients 0/50. Dysphagia or bloatedness not reported.

Conclusion: The novel technique which combines LSG with sLHR is feasible, safe and can be associated to GB removal. Preliminary results showed unanimous patient satisfaction, high remission rate of pre-existing GERD, decrease in PPI use and unimpaired weight loss. Further evaluation is necessary in a controlled and staged manner to establish the technique's real effectiveness.

Disclosure: No conflict of interest declared

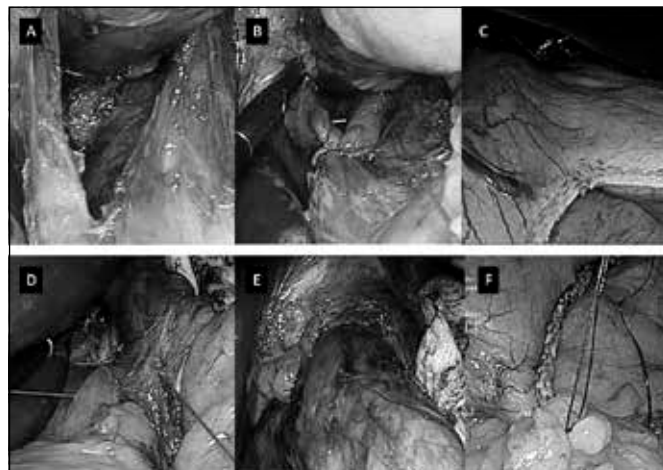


Fig. 1

PO3.062

Laparoscopic roux-en-y-gastric bypass comparing circular stapled, linear stapled and combined linear stapled with hand-sewn gastrojejunostomie – an optimizing process

[no abstract]

PO3.063

One year results of a randomized controlled multicenter study of an incisionless operating platform for primary obesity (pose™) vs. diet-exercise alone: The milepost study

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Background and Aims: The pose™ procedure is a minimally invasive technique which uses the g-Cath™ EZ Suture Anchor, part of the Incisionless Operating Platform™ (USGI Medical®, San Clemente, CA, USA) to treat patients with Class I and II obesity. During the procedure, an endoscopist or bariatric surgeon per-orally places full-thickness plications in the gastric fundus and distal body to modify gastric capacity and function. **Objectives:** The purpose of this study was to compare safety, satiety, and weight loss outcomes of subjects undergoing pose plus diet and exercise to those following diet and exercise alone.

Material and Methods: A prospective, multi site, open label, randomized controlled trial was conducted in 3 EU countries. Following Ethics approval, 44 patients with class I-II obesity were randomized in a 3:1 ratio (pose with diet and exercise counseling: diet and exercise counseling only [control]). Total body and excess weight loss (%TBWL, %EWL) were assessed at 12 months.

Results: Forty-four patients were randomized (77.3% female; mean age 38.3 ± 10.7 years; body mass index, 36.5 ± 3.4 kg/m²) to pose (n = 34) or control (n = 10) in 3 centers. Mean pose procedure time was 51.8 ± 14.5 minutes; pose patients received a mean 8.8 ± 1.3 fundal and 4.2 ± 0.7 distal body plications. Twelve-month TBWL was: pose group, 13.0% (EWL: 45.0%), n = 30 vs. control group, 5.3% (18.1%), n = 9, a significant mean difference of 7.7% (95% CI 2.2, 13.2; p < 0.01). At 12 months, pose patients showed significant reductions in satiety parameters (p < 0.001) compared to baseline. No serious device – or procedure-related adverse events occurred.

Conclusion: Analysis of the 12-month endpoint data collected during this randomized controlled trial showed that patients treated with pose experienced a 2.5 fold greater weight loss than patients who received diet and exercise guidance alone. In addition, at 6 and 12 months, pose pro-

cedure patients showed significant reduction in satiety parameters. These findings substantiate a clinical and statistically significant effect of the pose procedure on patients suffering from Class I and Class II obesity versus diet and exercise alone.

Disclosure: Study paid by USGI Medical

PO3.064

Comparing the efficacy of laparoscopic sleeve gastrectomy and laparoscopic gastric plication in patients with obesity and metabolic disorders.

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Background and Aims: Laparoscopic sleeve gastrectomy (LSG) is currently the gold standard bariatric procedure for the treatment of morbid obesity. Laparoscopic gastric plication (LGP) is a relatively innovative procedure which has been increasingly applied lately all over the world. The aim of a trial was to evaluate perioperative safety and 2-years results. **Material and Methods:** Sixty-two patients with body mass index (BMI) between 35 kg/m² and 50 kg/m² were underwent a restrictive bariatric procedures. LGP was performed to thirty-eight patients and twenty-four patients have chosen LSG. Patients were monitored for 2 years after the operation. During this period percent excess weight loss (%EWL), early and late complications, improvement of obesity related comorbidities and nutritional deficiencies were studied in both groups.

Results: There was no death in either group and there was no significant difference in early and late morbidity in both groups (11% after LGP and 12,5% after LSG). Weight loss was significantly better after LSG. During 2 study years %EWL reached 46% after LGP and 62% after LSG. There was no significant difference in the overall improvement of comorbidities. Nutritional deficiencies occurred at the same rate in the two groups except to vitamin B12 deficiency which was more common after LSG.

Conclusion: LSG and LRYGB are equally safe and effective in the amelioration of comorbidities. LSG has better result in %EWL while LSG is associated with fewer postoperative metabolic deficiencies, without the need of supplementation. Furthermore, LSG is a promising bariatric procedure. The use of laparoscopic GCP warrants additional investigation to prove the reliability and metabolic effectiveness of such new procedure.

Disclosure: No conflict of interest declared

PO3.065

Ligamentum teres hepatis – a usefull structure in bariatric surgery?

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Background and Aims: Reflux is a relevant problem after sleeve gastrectomy. GERD is already present in up to 45% before sleeve gastrectomy. Improvement can be expected in about 55%. New reflux after the operation is reported in up to 16–20%. Closure of a hiatal hernia seems to reduce de novo reflux. However there is no convincing approach to properly solve preexisting reflux or avoid new onset. We started a feasibility study to investigate whether the application of the ligamentum teres hepatis at the gastroesophageal junction might overcome reflux symptoms.

Material and Methods: The ligament was mobilised from the liver to the abdominal wall and was cut there. The ligament was always placed behind the esophagus. Fixation to the sleeve was performed semicircumferentially, or in a two third or circular fashion. Reflux was documented by patient's information. During the study we started to measure the length of the ligament.

Results: Merely 170 procedures are performed meanwhile. Half of them were prophylactically created in asymptomatic patients. The rest was done in patients with mild reflux in therapeutic intention. Mean follow up of about 12 months is still too short for a consistent analysis. In all symptomatic patients remission could be seen immediately. On the longer run we recognized failures in both groups already within one year. In these cases the distance of the ligament from the liver to the fixation at the sleeve was longer than 12 cm. Circular placement of the ligament resulted in functional stenosis in 80% needing reoperation.

Conclusion:

1. Postoperative stenosis and failures in both groups led to a variety of modifications in the ligament's placement. Therefore subgroups are small.
2. Follow up is too short. Reflux increases usually two years after the operation.
3. Up to now we are unable to define a standard procedure or to design a study.
4. Nevertheless we want to offer our idea and our experiences to the bariatric community for further evaluation of the technique.

Disclosure: No conflict of interest declared

PO3.066

Long – term effect of percutaneous electrical neurostimulation of dermatome T6 for appetite reduction and weight loss in obese patients

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Background and Aims: A continuous feeling of hunger is the major cause of dietary treatment failure in obese patients, making dietary leave. A previous study of our group demonstrated the percutaneous electrical neurostimulation (PENS) of T6 dermatome induces an appetite reduction and a significantly greater weight loss than only diet as preoperative measure in morbidly obese patients that will undergo bariatric surgery.

Objectives: The aim of this study is to evaluate the long-term effect of this therapy.

Material and Methods: A prospective study was performed, including obese patients with a BMI between 30–40 kg/m², undergoing PENS of dermatome T6. Weight loss, dietary compliance and appetite will be assessed before the treatment, after the 12 weeks of treatment and 3 and 9 months after finishing the therapy.

Results: 150 patients were included in the study. A mean weight loss of 11.8 + 2.6 kg was obtained after the 12 weeks of treatment. 3 months after finishing the therapy, mean weight loss was 14.6 + 2.7 kg and 9 months after finishing the treatment mean weight loss was 14.5 + 2.8 kg. Median appetite perception quantified by VAS was 6 before treatment, 1 after finishing the treatment, 1 three months after finishing the treatment and 4 nine months after finishing it. Dietary compliance after 12 weeks of treatment was 90%, 84% 3 months after finishing the treatment and 62% 9 months after finishing it.

Conclusion: PENS of dermatome T6 achieves a significant appetite reduction, which is maintained 3 months after finishing the therapy. Later on, they restored appetite, but they did not regain the weight lost..

Disclosure: No conflict of interest declared

PO3.067

Effect of pectoral electrostimulation on reduction of mammary ptosis after bariatric surgery

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Background and Aims: Over 90% of women report to be very dissatisfied with the aspect of their breast after bariatric surgery. Breast reconstructive

surgeries are often not funded by the National Health Service or private health insurances in many countries and the patient must pay a high economic amount to undergo it.

Material and Methods: A prospective randomized clinical trial of patients undergoing bariatric surgery was performed. Patients were randomly assigned into 3 groups: patients undergoing percutaneous electrostimulation (PENS) of the pectoral muscle combined with specific training (Group 1), patients doing the specific training alone (Group 2) and patients without any specific treatment (Group 3). The assigned treatment began 15 days after surgery and was maintained during 12 weeks.

Results: 25 women were included in each group. In the post-treatment anthropometric measures significant differences between groups could be observed in Regnault classification ($p = 0.014$), ptosis ($p = 0.017$) and projection ($p = 0.025$). Multiple comparisons revealed that there were no significant differences in all these variables between Group 2 and Group 3, whereas a significant difference could be observed between Groups 1 and 2 and 1 and 3. Median satisfaction score with the prescribed treatment was significantly better in Group 1 than in the other groups.

Conclusion: PENS of the pectoral muscle combined with specific training achieves a reduction in the breast ptosis and an increased projection, resulting in greater satisfaction of the patients, when compared with only specific training or without any specific activity.

Disclosure: No conflict of interest declared

PO3.068

Intragastric balloon therapy for obese and overweight patients: Results in 318 patients

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Background and Aims: Indication for intra-gastric balloon is weight reduction for mild to moderate obesity. Currently this indication has also been offered for cosmetic reasons in overweight patients.

Objectives: We evaluated the tolerance and efficacy of the intragastric balloon (IGB) in our patients.

Material and Methods: From January 2002 to August 2014, intragastric balloon was placed endoscopically, in 318 patients under IV sedation, with a mean BMI 30.6 kg/m² (25.5–60). Was filled with a mean of 600 ml of saline solution. Removal was done 6–7 months after balloon insertion, under general anesthesia with OT intubation for airway protection. Insertion and removal were done ambulatory

Results: Strictly followed by a team of nutritionists, 273 female (85.8%) and 45 male (14.2%) underwent IGB placement, that was uneventful. Mean age 34 (12–67). Mean time for insertion and extraction was 20 minutes. 38 (11.92%) patients did not complete the 6 months, mainly for intolerance or complication that required early removal, majority within the first 6 weeks. Adverse effects and complications are shown in attached slide. There was 1 gastric perforation (0.5%), 2 days after IGB placement, in a patient with previous anti-reflux procedure and required emergency surgery, repair and success recovery. Median weight loss was 11.1 kg (0.2–28.5 kg.). mean BMI loss 3,3 points. Mean EWL was 41% over 6 months.

Conclusion: The IGB appears to be safe, but may have serious complications. It is an absolute contraindication in patients with prior gastric surgery. Its efficacy to reduce weight in association with a well-supervised nutritional guidance might be a good indication for the mildly obese patient and even for cosmetic reasons in the overweight patient.

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Disclosure: No conflict of interest declared

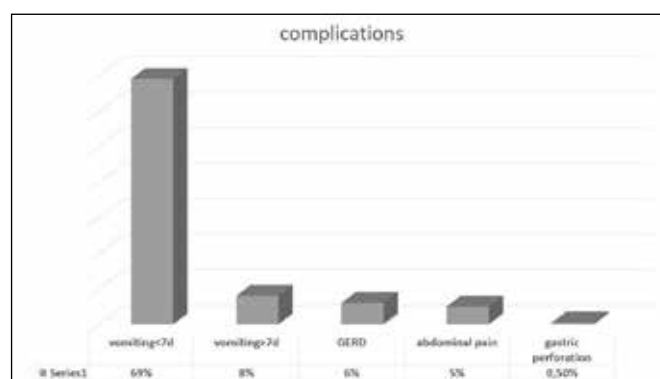


Fig. 1

PO3.069

Endoscopic Management of Morbid Obesity: Where Do We Stand?

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Background and Aims: Obesity has become a worldwide health epidemic. According to the world health organization statistics, more than 30% of the people all over the world are overweight while more than 10% are obese. This epidemic has a significant impact on the quality of life, morbidity and mortality of patients. Bariatric surgery has been proven to be the best and most durable choice for treatment of morbidly obese patients who failed other lines of treatment. Nevertheless surgery is not without complications, with a morbidity rate up to 15% and a mortality rate of 1–5%. Endoscopic procedures for morbid obesity have emerged to light during the last decades and they gained popularity among bariatric therapists as a line of management that is safer than surgery. They include restrictive procedures, endoscopic suturing devices, and malabsorptive sleeves. Outcomes, benefits and drawbacks need to be reviewed.

Objectives: Evaluate the outcomes, benefits, and drawbacks of primary endoscopic interventions for management of morbid obesity.

Disclosure: No conflict of interest declared

PO3.070

Thinking about the mechanical theory of fistulas and dehiscence in a sleeve gastrectomy. An experimental study of the resistance of the linear gastric stapling.

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Background and Aims: Few studies have evaluated the surgical stapling including colorectal surgery.

Objectives: To understand the mechanisms of appearance of a dehiscence of the staple line during a sleeve-gastrectomy, we analyze in this study the effect of the height of the staple line and the using tissue reinforcement on the onset of experimental fistula.

Material and Methods: This is an experimental study on the porcine model. The sleeve-gastrectomy were performed ex vivo. The pressure of developing a fistula was assessed by blowing air into the gastric tube immersed in water. The first experiment compared 8 sleeve gastrectomies with the use of green staple cartridges (three rows of 4.8 mm staples) and 8 sleeve gastrectomies combining green and blue cartridges (three rows of 3.5 mm staples). The second experiment used the same sequence with a reinforcement by an absorbable film (Biosyn, Covidien) in 5 sleeve gas-

trectomies with green staples (Duet TRS, three rows of 4.8 mm staples) and 5 sleeve gastrectomy with joint use of green and blue cartridges (Duet TRS, Covidien, three rows of 3.5 mm staples). The third experiment used the latest generation Tri-Staple comparing 5 sleeve gastrectomies with gray cartridges (three rows of staples of different height : 4 mm, 4.5 mm and 5 mm) and 5 sleeve gastrectomies with joint use of gray and purple cartridges (three rows of staples of different height: 3 mm, 3.5 mm and 4 mm). The outcome is the pressure in mmHg experimentally to create a fistula. Data are reported as mean and percentage. The nonparametric tests are used for data analysis.

Results: This is an experimental study on the porcine model. The sleeve-gastrectomy were performed ex vivo. The pressure of developing a fistula was assessed by blowing air into the gastric tube immersed in water. The first experiment compared 8 sleeve gastrectomies with the use of green staple cartridges (three rows of 4.8 mm staples) and 8 sleeve gastrectomies combining green and blue cartridges (three rows of 3.5 mm staples). The second experiment used the same sequence with a reinforcement by an absorbable film (Biosyn, Covidien) in 5 sleeve gastrectomies with green staples (Duet TRS, three rows of 4.8 mm staples) and 5 sleeve gastrectomy with joint use of green and blue cartridges (Duet TRS, Covidien, three rows of 3.5 mm staples). The third experiment used the latest generation Tri-Staple comparing 5 sleeve gastrectomies with gray cartridges (three rows of staples of different height : 4 mm, 4.5 mm and 5 mm) and 5 sleeve gastrectomies with joint use of gray and purple cartridges (three rows of staples of different height: 3 mm, 3.5 mm and 4 mm). The outcome is the pressure in mmHg experimentally to create a fistula. Data are reported as mean and percentage. The nonparametric tests are used for data analysis.

Conclusion: Staple height used is a determining factor in the emergence of a fistula on an experimental sleeve-gastrectomy. Staples low heights are more resistant to pressure. The buttressing of the staple line increases the resistance.

Disclosure: No conflict of interest declared

PO3.071

Weight management: Obalon® vs. Orbrera™ Intra-gastric Balloon.

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Background and Aims: The Obalon® is a new intra-gastric balloon, which involves a self-inflating balloon after swallowing the Obalon® capsule. This eliminates the necessity for an endoscopy for insertion. This new device is placed for a 12 week period and extracted via endoscopy. This study aims at evaluating the efficacy and safety of the Obalon®.

Material and Methods: A retrospective analysis was performed on a total of 58 patients that underwent Obalon® insertion and removal and 85 patients that underwent Orbrera™ intra-gastric balloon insertion from December 2014. Data included weight, Body Mass Index (BMI) and complication rate.

Results: 58 Kuwaiti patients underwent Obalon® insertion, of which the mean age was 36. Mean pre-procedure weight and BMI were 87kg and 33, respectively. There was a significant mean Weight loss of 1.4kg, 0.3kg and 0.3kg at one month, two months and three months, respectively (p-value <0.001). After removal of the Obalon®, a mean weight loss of 4kg and a BMI of were documented. 85 patients underwent Orbrera™ intra-gastric balloon insertion from December 2014, of which mean age was 31 years. Mean pre-procedure weight and BMI were 90kg and 35.5, respectively. There was a significant mean Weight loss of 6.4kg, 9.1kg and 4.4kg at one month, two months and three months, respectively (p-value <0.007). After removal of the balloon, a mean weight loss of 12.2kg and a BMI of 31.5 were documented. There was no significant difference with regards to age, gender or pre-procedure BMI between the Obalon® and Orbrera™ patients (p-value > 0.05). A significant difference was made clear when comparing the weight loss achieved at balloon removal, with a p-value < 0.005.

Conclusion: The Obalon® and Orbrera™ are feasible and safe in their own regards. A significant mean weight loss at removal was noted with both aforementioned balloons. There was more weight loss with the Orbrera™ system.

Disclosure: No conflict of interest declared

PO3.072

Specimen extraction technique via umbilical incision in laparoscopic sleeve gastrectomy

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Background and Aims: Number of cases of laparoscopic sleeve gastrectomy (LSG) has been increasing in recent years. Different surgeons have different preference in specimen extraction. It could be technically challenging which considered one of the most difficult part of the operation.

Objectives: The aim of this study is to investigate the specimen extraction technique via umbilical incision in LSG.

Material and Methods: The umbilical incision approach is and technically easy and time saving technique for specimen extraction. It allows the specimen extracted without enlarging a 15-mm trocar site.

Results: We report over a hundred cases of sleeve gastrectomy using this specimen extraction technique. No wound infections were observed. No incision enlargement was needed during the extraction. And the specimen was kept intact.

Conclusion: Specimen extraction technique via umbilical incision is a reliable method of intact specimen retrieval, typically without enlarging a 15mm trocar incision.

Disclosure: No conflict of interest declared

PO3.073

Chronic Pain after Bariatric surgery: Better or Worse? Do psychosocial factors play a role?

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Background and Aims: Meta-analysis demonstrates that bariatric surgery is an effective long-term treatment for obesity and its comorbidities. Although bariatric surgery is a rapidly expanding field, a gap in the literature exists regarding acute and chronic pain and opioid use postoperatively. Preliminary evidence suggests that chronic pain may be improved with weight loss after bariatric surgery; however opioid use or absorption may be altered. Our interdisciplinary team conducted two longitudinal studies to further examine this area.

Objectives: The purpose of the initial study was to examine the incidence and severity of acute and chronic pain after bariatric surgery. The aim of the second study was to further elucidate factors, especially psychosocial elements, which may contribute to the observed changes in chronic neuropathic and somatic pain and opioid use.

Material and Methods: Patients undergoing bariatric surgery at one surgical center were followed longitudinally. Data was collected at 7 time points including pre-operatively and up to 6 month post-op. Data collected included information regarding acute and chronic pain severity, chronic pain interference, and opioid use. In the second study, subjects were also followed longitudinally. Data was collected preoperatively, 6 months and 1 year postoperatively to capture chronic pain severity and interference. Variables examined included demographics, surgical variables and psychosocial factors such as emotional regulation, social support, anxiety and depression. Valid and reliable instruments were utilized for all primary study outcomes.

Results: The initial study showed decreased acute post-operative pain over time. The incidence and severity of chronic pain was significantly re-

duced at 6 months post-bariatric surgery. The interference of chronic pain in daily activities such as work, mood, and walking ability was significantly improved; however, this was not true for sleep. Preliminary results from our second study will also be presented which examine the contribution of demographic and surgical variables as well as psychosocial factors such as emotional regulation, social support, anxiety and depression on chronic pain after bariatric surgery.

Conclusion: Chronic pain and chronic pain interference with daily activities is improved after bariatric surgery. Results from the second study will address surgical and psychosocial factors that may correlate with this main finding.

Disclosure: No conflict of interest declared

PO3.074

Bariatric Surgery in Adolescents – a Two-year Follow-up Study

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Background and Aims: Almost every fourth child in European countries is overweight or obese and the prevalence of childhood obesity is increasing. The association between childhood obesity and obesity later in life has been clearly shown. Obesity is associated with shorter life expectancy and this is true especially in younger adults. Bariatric surgery has been shown to result in up to ten times higher weight loss compared to non-surgical interventions. It has also been shown to be associated with improved cardiovascular and metabolic risk factors in adolescents. The goal was to study weight loss up to five years postoperatively in adolescent undergoing bariatric surgery.

Material and Methods: A total of ten adolescents patients (under 18 years) accepted for bariatric surgery were included with follow-up at six weeks, one, two and five years. Body measurements were obtained at each follow-up.

Results: Median BMI at baseline was 44,2 kg/m² (range 37,9–56,9 kg/m²). Nine patients underwent gastric bypass, eight laparoscopically and one open. One patient underwent laparoscopic sleeve gastrectomy. At one-year follow-up, the median total weight loss (TWL) was 29% (range 27,1–42,1) and the median BMI had been reduced by 15,6 kg/m² (13,1–18,6) (n = 7). At two-year follow-up, a median of 35,5% TWL (range 32,3–38,7) and a median BMI reduction with 17,2 kg/m² (11,2–19,7) was shown (n = 4). See table.

Conclusion: Our results are in line with previous studies in adolescents. Since obesity is associated with shorter life expectancy and lower quality of life, long term studies on bariatric surgery in adolescents are warranted.

Disclosure: No conflict of interest declared

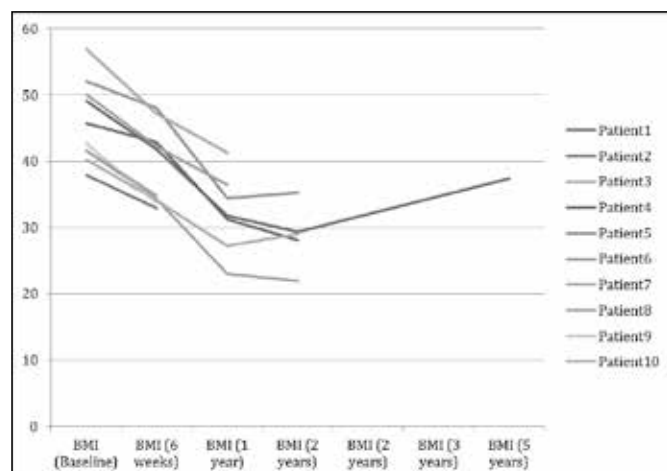


Fig. 1

PO3.075

Safety and efficiency of sleeve gastrectomy in elderly patients

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Background and Aims: The effectiveness of bariatric surgery in weight loss and improvement of the metabolic profile has been well documented in the literature. Still, there is reluctance in performing bariatric operations in older patients, with the rationale that the morbidity of the procedures outweighs the long term benefits. In this study we present the safety and efficiency of laparoscopic sleeve gastrectomy (LSG), performed on older patients.

Material and Methods: 28 patients, 5 men and 23 women, aged 60–66 years (median 62) underwent LSG in the years 2010–2015 by a single surgeon. Preoperative BMI ranged 40–66 (median 48). American Society of Anesthesiologists (ASA) score was 3. All suffered from one or more of the following condition: arterial hypertension, diabetes mellitus, dyslipidemia, hyperuricemia, chronic obstructive pulmonary disease (COPD), sleep apnea, chronic musculoskeletal pain. Follow up was 6–66 months (median 40). Weight loss, complications and changes in the metabolic profile were documented and the efficiency of the operation was measured with the BAROS score and the Moorehead-Ardelt Quality of Life Questionnaire II (QoL).

Results: There was no mortality. There was 1 major complication (a severe postoperative pneumonia that demanded stay in a High Dependency Unit) and 3 minor complication (1 case of dehydration and 2 cases of rhabdomyolysis). Average weight loss was 67% of excess weight. Hypertension was improved in 70% of cases, diabetes mellitus in 71%, dyslipidemia in 60%, hyperuricemia in 75%, COPD in 80%, sleep apnea in 100% and musculoskeletal pain in 67%. Average QoL score was 1.6 (Good) and average total BAROS score was 5.3 (Very Good).

Conclusion: Complication rates were low. Long term results in weight loss, health improvement and satisfaction were very good and comparable to younger ages, published in the literature. As a result, laparoscopic sleeve gastrectomy is deemed safe and effective in carefully selected elderly patients.

Disclosure: No conflict of interest declared

PO3.076

Duodenojejunal bypass decreased the high-fat-diet-induced intestinal hyperpermeability in rats

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Background and Aims: High-fat diet increases the intestinal permeability and induces subclinical endotoxemia [1]. Duodenojejunal bypass (DJB) strengthens epithelial barrier in lean rats [2]. However, the effect of DJB on gut permeability in obese subjects remains unclear.

Objectives: To evaluate the changes of intestinal permeability in high-fat-diet induced obese rats receiving Roux-en-Y DJB (HFD-DJB) and sham operation (HFD-SO), and normal-chow-diet lean rats receiving sham operation (NC-SO).

Material and Methods: Twenty-four Sprague-Dawley rats were randomly assigned to HFD-DJB, HFD-SO, or NC-SO groups. Tissues of the alimentary, biliopancreatic, and common limbs in the small intestine, and the colon, were collected 2 weeks after operation. Intestinal permeability was determined by mucosal-to-serosal dextran flux measured in Ussing chambers.

Results: The body weight was higher in HFD-SO than NC-SO, and significantly decreased after DJB. Compared with NC-SO, HFD-SO had increased dextran permeability in the alimentary limb, biliopancreatic limb, common limb, and colon. The intestinal hyperpermeability in HFD-SO was significantly reduced in the alimentary limb, common limb, and colon of HFD-DJB.

Conclusion: DJB in rats decreased the high-fat-diet-induced intestinal hyperpermeability. The result may provide an explanation for the decreased systemic endotoxemia after bariatric surgery.

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Disclosure: No conflict of interest declared

PO3.077

Organic consequences of isolated ileal interposition in rats with diet-induced dysglycemia

[no abstract]

PO3.078

Impact of bariatric gut surgical rearrangement on glucose absorption in vitro

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Background and Aims: Bariatric surgery often results in improved glucose tolerance prior to other changes. Our recent results suggest that altered presence of pancreatic enzymes in the gut may be involved in the improved glucose tolerance observed following surgery (1). Duodenal exclusion limits bile and pancreatic enzyme accessibility in the remaining intestinal channels, which may in turn affect intestinal permeability. Using sections of gut obtained from a porcine bariatric model, we investigated glucose uptake and barrier properties of the intestinal wall from different parts of the reconstructed intestine in vitro.

Material and Methods: Six pigs (15 ± 2 kg) underwent duodenal-jejunal bypass surgery with formation of 3 (70–100 cm) channels, i.e., a separated pancreaticobiliary, an alimentary (excluded from pancreaticobiliary secretions), and a common channel. After 3 weeks on a high-fructose diet (and glucose-load experiments) the pigs were euthanized, and gut segments from the different channels were tested in Ussing diffusion chambers. The passage of non-metabolizable methyl-C14-glucose, and the permeability markers, FITC-dextran (FITC-D4, 4.4 kDa) and ovalbumin (OVA, 44 kDa), over the segments was determined as the percentage passing from the mucosal to the serosal side during 2 hours.

Results: Glucose uptake in the alimentary and common channels was lower, at 70% and 55% respectively, compared to that observed in the pan-

creaticobiliary channel (1.24 ± 0.35% after 2 h). Similarly, the passage of the medium- and large-size markers was 70% and 60% lower, respectively, in the alimentary and common channels, than in the pancreaticobiliary channel (0.03 ± 0.01% for FITC-D4 and 0.003 ± 0.002% for OVA).

Conclusion: Exclusion of pancreaticobiliary secretion from the alimentary and also, most likely due to enzyme autolysis, the common channel results in decreased glucose absorption as well as marker permeability, as compared to that in the pancreaticobiliary channel. However, complementary studies are needed on the corresponding gut regions from intact animals to better understand bariatric surgery metabolic effects.

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Disclosure: No conflict of interest declared

PO3.079

Role of the duodenum in the regulation of glucose uptake after bariatric surgery – clinical data

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Background and Aims: Bariatric surgery reduces the symptoms of diabetes. But the quality of the treatment varies depending on the type of surgery performed. The aim is to highlight the impact of ileoduodenoplasty surgery type on glucose metabolism in obese/diabetic patients.

Material and Methods: Ileoduodenoplasty with the aim of treating diabetes was performed on 16 patients. Glucose metabolism was evaluated in 11 women and 5 men, ranging between 33–73 years old, with a BMI between 26.6–61.4 kg/m². Diabetes was detected for the first time in 8 patients. In the remaining 8 patients, diabetes had been present for between 5–15 years. Performing ileoduodenoplasty any gastrectomy was done. The duodenal switch was performed by the ileum replacing in a postgastric position. The influx of bile/pancreatic secretions from closed duodenum was performed into the terminal part of ileum. Levels of blood glucose, insulin, C-peptide, and HbA1c were evaluated in 9 patients from 1 to 3 years, in 7 – more than 3 years postoperatively.

Results: Morphologically, the duodenal wall experienced hypertrophy and hyperplasia, while the number of neuroendocrine cells and neurons increased. Three metabolic reaction types were found. Before surgery insulin levels were around 50.8 ± 7.14 pmol/L in group 1 (n = 7), 14.7 ± 3.47 pmol/L in group 2 (n = 6) and 5.8 ± 0.59 pmol/L in group 3 (n = 3). One-to-two weeks after surgery insulin levels were: 15.5 ± 4.84 pmol/L in group 1, 8.9 ± 2.79 pmol/L in group 2 and 15.0 ± 9.14 pmol/L in group 3. Postoperatively blood glucose levels level fell within the normal range in all patients. Evaluated after 8 years glycaemia was normal in all patients.

Conclusion: Ileoduodenoplasty had performed lead to the 8-year complete remission/eliminating of type 2 diabetes in all patients. As for rapid metabolic normalization evaluated after this surgery type had performed, we suppose the priority of regulatory effectiveness mechanism rather than malabsorption. Our data has highlighted the role of the duodenal mucosa, bile and pancreatic ferments on the release of insulin after a meal.

Disclosure: No conflict of interest declared

PO3.080

Bile acids in morbidly obese submitted to sleeve gastrectomy

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Background and Aims: Bile acids (BAs) have been demonstrated to play a vital role in modulating lipid and cholesterol metabolism, incretins and glucose homeostasis. They seem to be altered in overweight, obese and type 2 diabetes individuals. The observation that circulating BAs levels increase following bariatric surgery has proposed the hypothesis that they might be involved in weight-independent improvements in glucose homeostasis. The aim of the present study was to investigate the early changes of BAs and of glucose homeostasis parameters in morbidly obese (MO) patients submitted to sleeve gastrectomy (SG).

Material and Methods: Two groups of subjects were included in this study. The first group consisted in 24 MO patients and the second group was formed out of 10 healthy normal weight subjects. MO patients were evaluated anthropometrically (weight, BMI) and biochemically (bile acids, insulin, leptin and fasting blood glucose) before, at 7 and at 30 days respectively after SG. We used the standard formula to calculate HOMA-IR value.

Results: We found no statistical significance relative to the 7th operation day [$p = 0.194$ for insulin, and $p = 0.34$ for HOMA-IR] and to the 30th day [$p = 0.329$ for insulin and $p = 0.151$ for HOMA-IR]. The analysis of insulin and HOMA-IR changes as compared to the baseline moment revealed a reduction of the values by the 7th day (Ranks values: 74 versus 31 for insulin and 60 versus 31 for HOMA-IR) and by the 30th day after surgery (Ranks values: 98 versus 55 for insulin and 86 versus 34 for HOMA-IR). We found no statistical change in BAs at 7 days [$p = 0.938$] and at 30 days [$p = 0.289$] after surgery. For analyzed cases, we obtained an estimated mean increase of BA values by the first time point (Ranks values: 13 versus 15) and by the second time point (Ranks values: 10 versus 26).

Conclusion: There were no significant early changes after SG regarding BAs, insulin and HOMA-IR. However, a trend of the insulin and HOMA-IR values reduction and of BAs levels increase was observed.

Disclosure: No conflict of interest declared

PO3.081

Ghrelin levels after gastric plication and sleeve gastrectomy in an experimental model of obesity

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Background and Aims: Gastric plication is a technique that trends to emulate the restrictive and metabolic effect of Sleeve gastrectomy. There is great controversy about the benefits, and comparative studies are needed.

Objectives: Our objective is to determine the weight and ghrelin changes in both techniques in an experimental model of obesity.

Material and Methods: Sprague-Dawley rats 7 weeks old (12 GP+12 SG+6 sham). High fat (Cafeteria) diet for 4 weeks. Prior to surgery: puncture and cannulation of the external jugular vein under microscopic control for the extraction of blood (2cc). Daily monitoring of weight. Surgery: Midline laparotomy (4cm). Greater curvature dissection and ligation of vasa recta (silk 5/0). GP: invagination and longitudinal suture of the gastric greater curvature and the rumen by using tutor (pipette 1 cm-diameter) SG: linear longitudinal gastrectomy with partial resection of the rumen and double continuous suture (polypropylene 4/0) Tube of 8 Fr. 4 weeks after surgery, we proceed to sacrifice and another blood extraction.

Results: Sleeve gastrectomy causes a major weight loss at long term than Gastric Plication. Gastric plication group trends to have a similar weight

than sham group after four weeks. A decrease in ghrelin levels is evidenced after Sleeve gastrectomy, but not in Gastric Plication group (1.14 ± 0.34 ng/ml to 2.29 ± 0.56 mg/ml after surgery ($p = 0.002$)).

Conclusion: Gastric Plication may represent an alternative in bariatric surgery at short term, in terms of weight

loss, but metabolic effects are not the same as Sleeve Gastrectomy. More studies in morbid obese population are needed in this direction.

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Acknowledgement: To animal house workers and students of our medical school.

Disclosure: No conflict of interest declared

PO3.082

Acute complement C3 veranderingen ten gevolge van bariatrische chirurgie

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Background and Aims: Inflammation is an important factor in pathogenesis of obesity-related comorbidity, such as metabolic disease, cardiovascular disease and different types of malignancies. The complement system is proposed as a major determinant in the development of these diseases. Complement C3 (C3) is elevated in obese subjects and levels decrease with weight loss after bariatric surgery. Is this decrease in C3 related to the rate of weight loss or caused by metabolic and hormonal changes typical for bariatric surgery?

Material and Methods: Data was collected in a prospective longitudinal study in bariatric patients, on the relation of inflammation in serum and adipose tissue and the effect of weight loss on these relations. Patients were scheduled for sleeve gastrectomy (LSG) or Roux-en-Y gastric bypass (LRYGB). Markers of inflammation were measured during preoperative screening, on the day of surgery and one day postoperatively. Changes in inflammatory markers and differences between both procedures were analyzed using non-parametric tests.

Results: 29 patients were included (24 women, age 43 years, BMI 41.5 kg/m^2), of which 15 underwent LRYGB. Weight significantly decreased between screening and the day of surgery. However, no significant differences were seen in CRP and C3 levels. One day postoperatively, CRP levels were significantly increased compared to the day of surgery (17 and 7 mg/l, respectively), while C3 levels decreased significantly (1.34 and 1.40 mmol/l , respectively). This decrease was more profound after LSG than after LRYGB (0.10 and 0.03 mmol/l , respectively). There is no correlation of changes in C3, CRP and weight.

Conclusion: In contrast to regularly measured parameters of inflammation, C3 levels decrease significantly after bariatric surgery. This decrease could be explained by increased complement activation, although previous studies showed an acute decrease of C3 metabolite C3adesArg postoperatively. This acute decrease is possibly caused by reduced syntheses of C3 in liver and adipose tissue, through specific changes as a result of this type of procedure. Acute C3 changes could play a role in the immediate metabolic and hormonal changes as seen after bariatric surgery.

Disclosure: No conflict of interest declared

PO3.083

Factors Leading to Self-removal from the Bariatric Surgery Program after Attending the Orientation Session

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Background and Aims: Bariatric surgery has been widely accepted as a treatment modality for obesity in Canada. Pre-operative orientation (education) sessions are the first point of contact and are a recommended component of pre-bariatric surgery assessment. Self-removal rates after the program orientation can be as high as 25% despite the proven efficacy of the procedure. The objective of this study was to identify factors contributing to patient self-removal after orientation using a mixed methods approach.

Material and Methods: The study sample consisted of subjects who attended the Toronto Western Hospital Bariatric Surgery Program (TWHB-SP) program orientation between 2012 and 2013 and then self-removed from the program (N = 216). Subjects were interviewed via telephone using a semi-structured interview guide, resulting in both quantitative and qualitative data. Factors leading to discontinuation were rated on a 5-point Likert scale. Qualitative data was analyzed using constant comparative methodology.

Results: The response rate was 59% with a 40.7% completion rate (N = 88). Concern about potential surgical risk and complications and concern about ability to adapt to changes in eating and drinking postoperatively were identified as the top two factors which led to program discontinuation. Thematic analysis uncovered 11 major themes related to patient self-removal. Unexpected themes include perceived personal suitability for the surgery, family impact, miscommunication with the family physician and perception of orientation information.

Conclusion: This is one of the first studies examining barriers to bariatric surgery in the pre-operative setting. The results offer new insights into the reasons patients self-remove from the program following orientation. This study may inform changes needed in the pre-operative process and assist in improving access to this effective surgical intervention.

Disclosure: No conflict of interest declared

PO3.084

Sarcopenia is associated with insulin resistance and the early phase of type 2 diabetes: The Korean Health and Genome Study (KHGS)

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Background and Aims: Recent studies have focused on the potential impacts of sarcopenia and SO on metabolic disorders beyond physical disability. It has been postulated that sarcopenia with or without obesity may contribute to the risk of metabolic syndrome and type 2 diabetes. However, the definition of sarcopenia and SO in older persons is still controversial, and its use in clinical practice is debated.

Objectives: The aim of this study was to determine appropriate criteria for age-related sarcopenia and sarcopenic obesity (SO), and investigate relationships among sarcopenia, insulin resistance and risk of type 2 diabetes.

Material and Methods: Our analyses included 1285 men and 1724 women who had complete data available for body composition analysis and the 75 g oral glucose tolerance test. Sarcopenia was assessed by the appendicular skeletal muscle mass (ASM)/height², and the ASM/weight (%) or the skeletal muscle mass index (SMI). Obesity was identified based on the total body fat percentage or the BMI.

Results: ASM/weight and SMI, but not ASM/height², were inversely associated with the homeostasis model assessment of insulin resistance (HOMA-IR). The prevalence of sarcopenia and SO, defined as ASM/weight less than the one standard deviation below the sex-specific normal mean of a younger reference group and a BMI of over 25 kg/m², tended to be higher with increased HOMA-IR tertile. Compared to either sarcopenia or obesity alone, SO was associated with a higher risk of pre-diabetes and type 2 diabetes in those 60 years or older after adjusting for confounding factors. Subjects with sarcopenia were at especially high risk of newly diagnosed diabetes in older age groups.

Conclusion: Sarcopenia and SO, assessed by the ASM/weight and BMI, were strongly associated with the degree of insulin resistance and the early phase of type 2 diabetes. These findings suggest that sarcopenia could be an important role in the progression from pre-diabetes to type 2 diabetes.

Disclosure: No conflict of interest declared

PO3.085

Torsion of the Wandering Spleen and Pancreatic Tail precipitating Diabetic Ketoacidosis in a Prader Willi syndrome patient

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Background and Aims: Prader-Willi syndrome (PWS) is a genetic disorder due to lack of expression of genes on paternally inherited chromosome 15q11.2-q13. The prevalence of PWS is about 1 in 25,000 live births¹. The endocrine issues associated with PWS are extensive because of the hypothalamic and pituitary dysfunction which includes obesity (mean BMI 37 kg/m²), type 2 diabetes mellitus (T2DM)(25%), adrenal insufficiency, growth hormone deficiency and hypothyroidism. In the early stages of diabetic ketoacidosis (DKA), the cause of abdominal pain can be difficult to establish. Routine computed tomography (CT) scan for every DKA would lead to over-investigation. This is because diffuse abdominal pain occurs in more than 50% of patients with DKA and resolves with DKA treatment.

Material and Methods: We present a case of diabetic ketoacidosis precipitated by torsion of a wandering spleen in a 22-year-old woman with morbid obesity (BMI 35 kg/m²), PWS and T2DM. To our knowledge, this has not been reported in literature before.²

Results: The above mentioned Chinese-ethnicity woman was admitted for DKA and persistent abdominal pain. CT scan abdomen showed the pancreatic tail was involved in the torsion of the wandering spleen leading to hyperamylasaemia and pancreatitis. The splenic torsion and pancreatitis were treated conservatively initially with resolution of symptoms. A year later, she had another 2 episodes of severe abdominal pain due to worsening splenic torsion which subsided with conservative management. She then underwent an elective splenectomy which found a wandering spleen, enlarged with long splenic pedicle that had torsion of 720 degrees.

Conclusion: Wandering spleen and torsion should be considered as a differential diagnosis in a PWS with abdominal pain. Splenic torsion is a precipitant of DKA.

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Disclosure: No conflict of interest declared

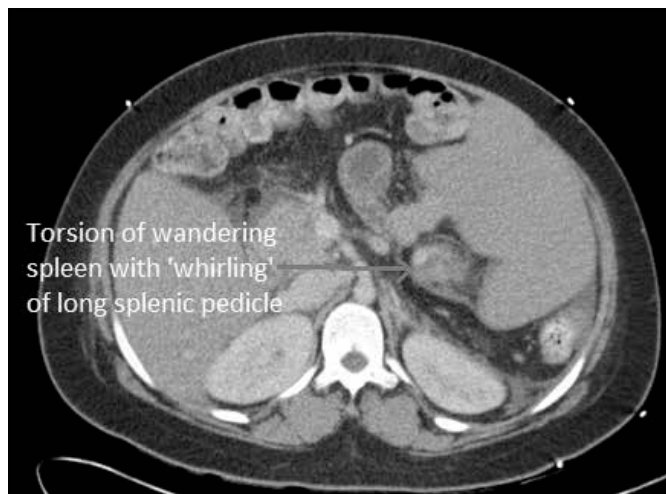


Fig. 1



Fig. 2

PO3.086

Fecal score as a measurement for changes in bowel habits after roux-en-y gastric bypass: A prospective study

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Background and Aims: After Roux-en-Y Gastric Bypass (RYGB) calcium and vitamin D deficiencies are frequently reported. In the presence of adequate vitamin D levels, calcium deficiency is caused by a lower efficacy of the intestinal calcium transport, such as increased transit time. Calcium deficiency can be recognized biochemically as secondary hyperparathyroidism (SHPT), because the body compensates the deficit of calcium by reabsorbing calcium from the skeleton. SHPT can contribute to an increased bone turnover and subsequently to bone loss and an increased risk of osteoporotic fractures.

Objectives: The objective of the present study was to investigate the relationships between semi-quantified stools scores, also called fecal score (FS), calcium and phosphate metabolism in the first year after RYGB surgery in a prospective study.

Material and Methods: Seventy-five calcium and vitamin D supplemented patients were prospectively studied before RYGB surgery and at 6 and 12 months of follow up. FS and plasma calcium (mmol/l), phosphate (mmol/l), magnesium (mmol/l), vitamin D (nmol/l) and parathyroid hormone (PTH, pmol/l) levels were measured in each patient.

Results: Mean BMI was 45 ± 5 kg/m² preoperatively and decreased to 34 ± 5 kg/m² at 6 months and to 31 ± 5 kg/m² at 12 months, with a total body weight loss (%TBWL) of $23 \pm 6\%$ and $31 \pm 8\%$. There were no significant changes in serum calcium levels at different time points. Mean PTH levels rose from 3.5 at baseline to 4.1 pmol/l at 6 ($P = 0.01$) and 4.9 pmol/l at 12 months ($P < 0.001$). In total 9 patients (12%) had increased PTH levels at 6 and 14 patients (19%) at 12 months. A significant positive correlation between FS and PTH at 12 months was found, which persisted after adjusting for vitamin D levels ($P = 0.022$).

Conclusion: Fecal score is positively correlated with SHPT using vitamin D-adjusted PTH levels as biochemical marker. These data have been shown in humans and confirms animal data. The present study emphasizes that stool habits are important in optimizing patient management after bariatric surgery.

Disclosure: No conflict of interest declared

PO3.087

Surgeons on laparoscopic sleeve gastrectomy learning curve do not worsen effects of bariatric treatment

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Background and Aims: In Poland morbid obesity affects 300000 people. Unsatisfactory results of conservative treatment cause continuous increase of laparoscopic sleeve gastrotomies (LSG) performed in Poland and worldwide. We aimed to evaluate learning curve influence on operative and perioperative period and bariatric treatment effects, based on a 6-year experience.

Objectives: Identification of learning curve stabilization point. Analysis of influence of learning curve on operation course, perioperative complications, one-year-after bariatric treatment effects.

Material and Methods: Data of 233 patients, operated on morbid obesity in the 2nd Department of General Surgery Jagiellonian University Medical College since 2009 till 2015, were collected retrospectively. Patients' demographical and clinical data were included in this work. Follow-up visits were one year after procedure. Patients were divided into two groups: operated by surgeons on the learning curve and by mentor surgeon. Analysis were conducted using Statistica 10.0 PL. Pearson's test and chi-square with Yates' correction assessed qualitative data. T-student, Mann-Whitney's tests analyzed quantitative data. Statistical significance was observed with $p < 0.05$.

Results: Groups did not differ in age, gender and co-morbidities, except for more frequent sleep apnea and COPD in mentor's group. Maximal BMI, maximal weight, BMI and weight on the procedure day were greater in mentor's group. Median procedure time in learning curve group differed from mentor's group [120 (90–150) vs 90 (70–120) min.; $p = 0.047$]. Intraoperative complications and reoperation rates did not differ in groups ($p = 0.292$; 0.787). Intraoperative adverse effects occurred only in learning curve group. Median complication rate of 7.73% did not differ groups ($p = 0.170$). Stabilization point was 25th performed procedure. No significant differences of %WL, %EWL and %EBMIL were observed ($p = 0.628$; 0.481 ; 0.533).

Conclusion: Operations performed by surgeons on LSG learning curve do not increase the risk of complications or reoperations. Learning curve stabilization point in the 2nd Department of General Surgery JUMC is 25th performed procedure. Intraoperative adverse effects occurring on the learning curve do not increase complication rate. LSG performed by a learning surgeon do not worsen

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Disclosure: No conflict of interest declared

PO3.088

Six years results of revisional laparoscopic Roux-en-Y gastric bypass (rLRYGB) after failed gastric banding (LAGB)

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Background and Aims: Long-term failure of LAGB is high. At our institution we initially performed bilio-pancreatic diversion with duodenal switch (BPD-DS) in cases of LAGB failure as part of a staged concept, possibly over treating a number of patients. Lately, rLRYGB has become popular after failed LAGB. Most published series are based on a mean follow-up of 2–3 years.

Material and Methods: Retrospective analysis of prospectively collected data on weight loss, co-morbidities, re-operations, complications, and quality of life including BAROS score (Bariatric Analysis and Reporting Outcome System) of rLRYGB was performed, with a mean follow up of 6 years (range 2–9 years).

Results: Overall 74 patients met our inclusion criteria. Baseline characteristics at the time of LAGB: age 40 ± 10 years, 55 women and 19 men, weight 120 ± 15 kg, BMI 42 ± 4 kg/m². On average it took 6.3 ± 3.1 years from initial LAGB to rLRYGB. The most common indications for rLRYGB were band intolerance (59%), band slippage (12%), pouch dilatation (6%), insufficient weight loss (3%) and/or secondary weight regain (9%). Baseline BMI decreased to 35.2 ± 5.9 kg/m² at the time of rLRYGB and further to 30 ± 4.8 kg/m² after a mean follow-up of 6 ± 2.2 years, resulting in an excessive BMI loss of $72.6 \pm 27.9\%$. According to BAROS score, 60% had a good to excellent result. Remission/improvement rate for diabetes and arterial hypertension was over 50%.

Conclusion: Long-term results of rLRYGB as a revisional procedure after failed LAGB proved satisfactory concerning weight loss and quality of life/co-morbidities using BAROS score..

Disclosure: No conflict of interest declared

PO3.089

Population estimates and characteristics of Australians potentially eligible for bariatric surgery – findings from the 2011/13 Australian Health Survey

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Background and Aims: Similar to other countries, Australian guidelines for the management of overweight and obesity recommend that bariatric surgery be considered for adults with resistant class-3 obesity, or resistant class-1 or 2 obesity combined with specific obesity-related comorbidity. Most bariatric surgery in Australia is privately funded (>90%) with approximately 12,000 procedures performed in 2012.

Objectives: To determine the potential demand for publicly- and privately-funded bariatric surgery in Australia, based on best approximations of eligibility criteria for bariatric surgery recommended in the 2013 national guidelines.

Material and Methods: Nationally representative data from the 2011–13 Australian Health Survey were used to estimate the numbers and characteristics of Australians meeting specific eligibility criteria.

Results: Of the 3,352,037 adult Australians (18–65yrs) estimated to be obese in 2011–2013, 865,693 (25.8%; confidence intervals (CI) 22.5, 29.2) were potentially eligible for bariatric surgery (6.1% (CI 5.3, 7.0) of the

total adult population aged 18–65 ($n = 14,122,020$)). Of these 396,856 (45.8%; CI 41.3, 50.4) had class 3 obesity; 468,368 (54.1%; CI 49.6, 58.6) had class 2 obesity; 467 (0.05%; CI 0.00, 0.17) had class 1 obesity; 455,355 (52.6%; CI 47.0, 58.2) were female; 400,491 (46.3%; 37.5, 55.0) had no private health insurance; and 302,993 (35%; CI 28.6, 41.4) resided outside of a major city.

Conclusion: Potential demand for bariatric surgery in Australia, particularly in the public health system and outside major cities, far outstrips current capacity, underscoring the immediate need for better guidance on patient prioritisation. The total estimated to be potentially eligible for surgery provides a strong signal that other interventions are necessary to assist this population group.

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PO3.090

The experience of waiting for publicly-funded bariatric surgery

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Background and Aims: The physiological, psychological and social impact of waiting for bariatric surgery has been investigated in few studies and is incompletely understood.

Objectives: To explore the experience of waiting for publicly-funded bariatric surgery in a tertiary health setting across four regions in the Australian state Tasmania.

Material and Methods: Semi-structured focus groups conducted in 2014 and structured interviews conducted in 2015 involving people on the wait list for or who had received publicly-funded bariatric surgery were audio-recorded, transcribed and analysed thematically.

Results: 11 women and six men engaged in one of six focus groups and an additional 10 women and nine men completed a structured individual interview. Mean age was 53 years (range 23–66) and mean waiting time for those on the waiting list was six years (range 2–12 years). Many participants viewed bariatric surgery as their last chance for weight loss with high hopes that surgery would positively improve their life. However, the waiting experience was often described as emotionally challenging (e.g. frustrating, depressing and stressful) and experiences of weight gain and deteriorating physical, psychological and social health were common. Lack of communication about waitlist position and expected date of surgery had negative emotional consequences for many participants. Significant others and general practitioners were important sources of support but the discussions indicated that better communication from health administrators about waitlist position, peer support groups and professional dietetic and psychological input were other support needs. Commonly, participants appeared well-informed about the surgery with most having realistic expectations (e.g. regarding weight loss and health improvement) and an understanding of their own role in the success of the surgery. Methods being used by some participants to prepare for surgery included making positive lifestyle changes, dietary change to reflect post-surgical requirements, psychological preparation and reading related literature.

Conclusion: Waiting for bariatric surgery can be emotionally difficult and may be associated with weight gain and deteriorating health. Addressing these issues may improve outcomes in this patient group. These findings have implications for health service planning..

Disclosure: This work was supported by an Australian National Health and Medical Research Council (NHMRC) Partnership Project Grant (APP1076899). AV is supported by a NHMRC Research Fellowship. MH is an employee of the Department of Health and Human Services Tasmania and as such does not receive direct personal funding from any of the sources declared above. MH has been involved in making policy decisions and funding allocations for the provision of bariatric surgery in Tasmanian public hospitals. All other authors declare they have no competing interest.

PO3.091

Different supplementation regimes to treat perioperative vitamin B12 deficiencies in bariatric surgery: A systematic review.

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Background and Aims: Vitamin B12 deficiencies are common after bariatric surgery. The evidence for the optimal vitamin B12 supplementation regimen after bariatric surgery is lacking. The dose of vitamin B12 in multivitamin (MV) supplementation in the current literature shows a wide range of variety. There is also no consensus about the right treatment of a vitamin B12 deficiency. This systematic review specifically focuses on vitamin B12 supplementation regimes after bariatric surgery.

Material and Methods: A systematic literature search on different supplementation regimes to treat perioperative vitamin B12 deficiencies in bariatric surgery was performed. The methodological quality of the included studies was rated using the Newcastle Ottawa scale for non-randomised trials (NOS). The agreement between the reviewers was assessed with Cohen's kappa.

Results: A total 9 studies were included, whose methodological quality ranged from moderate to good. The Cohen's kappa was 0.69. Majority the studies only used an oral MV supplementation regimen. In these studies vitamin B12 deficiencies were often seen. Two studies used an intramuscular vitamin B12 regimen as standard treatment next to oral MV supplementation. In these studies, no vitamin B12 deficiencies were seen. Included studies did not control the vitamin B12 deficient related complaints. Clinical relevance of the deployed supplementation regime has not been studied in all manuscripts.

Conclusion: In bariatric surgery, vitamin B12 deficiencies have a high prevalence. Unfortunately there is no consensus about multivitamin supplementation and any additional vitamin B12 supplementation. However, in current literature there is lack of high quality randomized controlled trials assessing the effects of different vitamin B12 supplementation. Further research must focus on a better diagnosis of a vitamin B12 deficiency with possible additional parameters like MMA and homocystein, the right dose of vitamin B12 supplementation and the clinical relevance beside biochemical data.

Disclosure: No conflict of interest declared

PO3.092

Adipocytokines-autophagy crosstalk in adipose tissue and adipocytes – relevance to adipose tissue dysfunction in obesity

[see the abstract PP1.13]

PO3.093

Optimizing postoperative outcomes after gastric bypass surgery – the influence of dietary protein and its amino acid composition: A systematic review

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Background and Aims: Bariatric surgery has emerged as an effective method to reduce morbid obesity. Nutritional counseling is essential in order to achieve maximal treatment success and to avoid long term complications. Increased dietary protein intake or its amino acid composition could have beneficial influence on various postoperative results. The aim of this systematic review is to examine the level of evidence of the relationship between dietary protein intake or supplementation with amino acids and postoperative outcomes after gastric bypass surgery.

Material and Methods: We conducted a systematic literature search in four electronic databases (Cochrane Central Register of Controlled Trials, EMBASE, PubMed and Scopus).

Results: Out of 6043 hits, nineteen studies were included, seven randomized and twelve non-randomized studies with varying study designs, interventions and outcomes. For most postoperative outcomes, studies did not provide solid evidence of any beneficial effect. Only an increased dietary protein intake was associated with improved weight loss after gastric bypass surgery, but the level of evidence is low (Grade C).

Conclusion: The study of the influence of protein and its amino acid composition represents an important developing domain of knowledge and needs further attention considering the high popularity of bariatric surgery. For future study purposes, we recommend a clear description of the exact quantity and composition of the proteins and amino acids in the diet or supplement.

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PO3.094

Discrepancies in the relation of BMI, adipose tissue volume, classic cardiovascular risk factors and adipose tissue inflammation

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Background and Aims: Obesity is related to increased cardiovascular risk. Adipose tissue inflammation is thought to play a leading role in these obesity-related diseases by causing a low grade systemic inflammation. It remains unknown whether the severity of obesity, in terms of BMI or adipose tissue volume, is reflected in the severity of cardiovascular risk and systemic inflammation. This study investigates these relationships in a cohort with wide ranges of BMI.

Material and Methods: Lean and obese subjects participating in observational studies were included. Both, the group of lean subjects (i.e. BMI < 30) and the group of obese subjects (i.e. BMI ≥ 30) were categorized in quintiles according to BMI and relations with cardiovascular risk factors were analyzed using nonparametric tests. Adipose tissue volumetry was performed when abdominal CT-scans were available.

Results: The cohort consisted of 953 subjects (591 women; mean age \pm SD, 49.9 ± 14.8 years), with 377 lean subjects and 576 obese subjects. The obese group included significantly more women, more T2DM, more HT and more smokers. Blood pressure, apoB and LDLC showed a significant dose-response relationship with increasing BMI in the lean group, but not in the obese group. HDLC decreased with higher BMI in both groups. Inflammatory markers like CRP, leukocyte count and C3 increased with increasing BMI in the obese group; these relations were less clear in lean subjects. Within the obese group, the fifth quintile had a significant larger area of subcutaneous adipose tissue, compared to the first quintile. No differences were seen in the area of visceral adipose tissue.

Conclusion: Lipid associated risk factors showed a significant dose-response relationship with increasing BMI in lean subjects, but not in obese subjects. There seems to be a maximal deterioration of these factors in mild obesity, without further exacerbation when BMI reaches the morbid obesity levels. It can be hypothesized that the deterioration is caused by visceral adipose tissue expansion, while morbid obesity, compared to mild obesity, is characterized by subcutaneous adipose tissue expansion.

Disclosure: No conflict of interest declared

PO3.095

A cost-effectiveness analysis of multivitamin supplementation in morbid obese patients after Roux-en-Y Gastric Bypass.

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Background and Aims: Morbidly obese patients undergoing bariatric surgery are prone to develop vitamin and mineral deficiencies, which may worsen in time. In order to prevent these deficiencies after bariatric surgery all bariatric patients are advised to take a multivitamin supplement (MVS). In collaboration with a pharmaceutical manufacturer an optimized multivitamin supplement (WLS Forte[®], FitForMe, Rotterdam, the Netherlands) was developed. A randomized controlled trial (RCT) was performed which concluded that the percentage of patients with a post-surgical deficiency could be reduced from 31% in patients using a MVS (100% recommended daily allowance [RDA]) to 14% in the WLS Forte[®] group.

Objectives: The aim of the current study was to assess the cost-effectiveness of WLS Forte[®] compared to a standard over the counter available MVS (sMVS, containing 100% RDA).

Material and Methods: This cost-effectiveness analysis was performed for the Netherlands. Between June 2011 and March 2012 a total of 148 patients were randomized to one tablet daily of either WLS Forte[®] or sMVS. The patients were followed for 12 months. Data on costs within the health sector and outside the health sector were collected.

Results: In total 10 (14%) patients in the WLS Forte[®] group versus 23 (31%) patients in the sMVS group developed a deficiency. The WLS forte[®] supplement was more expensive compared to a sMVS; respectively €30 versus €23 every three months. Return visits and associated cost for medical staff were the largest costs; €3350 in the WLS Forte[®] group versus €7705 in the sMVS group ($p < 0.005$). The total costs per year per patient were lower in the WLS Forte group compared to the sMVS group; €125 versus €243 respectively.

Conclusion: Treatment with WLS Forte[®] is more expensive than sMVS. However, treatment with WLS Forte[®] resulted in less vitamin and mineral deficiencies, which eventually resulted in less overall costs.

Disclosure: Dr. F.J. Berends and dr. I.M.C. Janssen are consultants for FitForMe, Rotterdam, the Netherlands

PO3.096

Long-term results of Laparoscopic Sleeve Gastrectomy for morbid obesity: 5 to 8 year Results

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Background and Aims: Although long-term results of sleeve gastrectomy (LSG) remains scarce in literature its popularity as a stand-alone procedure has accounted for a global increase in LSG performance. In this retrospective study, the authors present 5 to 8 year follow-up results in terms of weight loss, failure / revision rate and comorbidity resolution from a single center.

Material and Methods: A prospectively maintained database was reviewed for patients who underwent LSG between 2007 and 2010. A total of 277 patients were identified. Data analysis on weight loss, comorbid conditions, revision surgery and mortality was conducted.

Results: Median percentage excess BMI loss (%EBMIL) was 59,0%, and 53,9%, and median percentage total weight loss (%TWL) was 25,1%, and 22,9% at 5 and 8 years respectively. Revision to gastric bypass due to insufficient weight loss or GERD was performed in 42 patients (15,2%). Resolution of comorbid condition was achieved in 91% of patients with obstructive sleep apnea syndrome (OSAS), 68% of patients with type 2 diabetes (T2DM), 53% of patients with hypertension, and 25% of patients with dyslipidemia.

Conclusion: This study adds to the currently available data confirming the LSG to be a safe and effective procedure at long term. Data from high volume studies are needed to establish the definite role of the LSG in the spectrum of bariatric procedures.

Disclosure: No conflict of interest declared

PO3.097

Hyoscine injection eases morbid obesity and other gastric surgeries

[no abstract]

PO3.098

Promoting healthy eating habits towards employees and restaurants: The European FOOD programme (Fighting Obesity through Offer and Demand)

[no abstract]

PO3.099

The effect of obesity on anti-Xa concentrations in bariatric patients

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Background and Aims: Morbidly obese patients have an increased risk for venous thrombo-embolisms (VTE), especially after bariatric surgery and therefore adequate postoperative prophylactic exposure to low molecular weight heparins is of utmost importance. It is assumed that morbidly obese patients should receive higher dosages of nadroparin than patients of normal weight, however, clear dosing guidelines to achieve adequate prophylactic anti-Xa levels are lacking.

Objectives: To prospectively evaluate the relationship between various body weight descriptors and anti-Xa activity and to determine the dose-linearity of nadroparin in morbidly obese patients.

Material and Methods: The study population consisted of patients with a total bodyweight (TBW) of ≥ 140 kg and BMI ≥ 40 kg/m² scheduled for a Roux-en-Y gastric bypass (RYGB). Patients (n = 50) received a daily post-operative dose of 5700 IU of nadroparin subcutaneously during 4 weeks. Anti-Xa concentrations were determined 4 hours after the last nadroparin administration. To determine the dose-linearity, anti-Xa was also determined following a pre-operative dose of 2850 IU of nadroparin in another 50 patients

Results: A total of 100 patients were included with a mean TBW of 148.5 ± 12.6 kg. The average (\pm SD) postoperative anti-Xa concentration following 5700 IU nadroparin was 0.19 ± 0.07 IU/ml. 32% Of all patients had anti-Xa levels below the prophylactic range. Anti-Xa activity strongly inversely correlated with TBW ($p = 0.003$) and Lean Body Weight (LBW, $p = 0.001$), and 67% of patients with a LBW ≥ 80 kg had insufficient anti-Xa activity concentrations. There was a strong correlation between dose per LBW versus anti-Xa activity ($p < 0.001$). Based on this linear relationship a higher nadroparin dose should be considered in patients with LBW ≥ 80 kg to achieve anti-Xa concentrations within the prophylactic range. **Conclusion:** In morbidly obese patients, a postoperative dose of 5700 IU of nadroparin results in subprophylactic exposure in a significant proportion of patients. Especially in patients with LBW ≥ 80 kg a higher dose may potentially be required to reach adequate prophylactic anti-Xa levels.

Disclosure: No conflict of interest declared

PO3.100

Physical functioning one year after bariatric surgery compared to non-operated controls

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Background and Aims: Obesity is known to be related to impairments in physical functioning, but only little data exists on improvements after surgery-induced weight loss. The aim of this study was therefore to comprehensively assess changes in physical functioning in severely obese subjects after bariatric-surgery-induced weight loss.

Objectives: To compare physical functioning one year after Roux-en-Y gastric bypass (RYGB) surgery to that before surgery and to that of matched controls.

Material and Methods: Movement speed (timed lying-to-standing (TLS) test; timed up-and-go (TUG) test), maximal isometric strength, and cardiorespiratory fitness were tested in 10 subjects with severe obesity before and one year after RYGB. One-year postoperative performance was compared to sex- age, weight- and height-matched controls (n = 10).

Results: After RYGB, body mass (BM) was 38.7% lower ($P < 0.001$). Excess weight loss was $95.6 \pm 22.4\%$. TLS-performance increased ($P = 0.002$), while TUG-performance remained unchanged ($P = 0.336$). Absolute back muscle and knee-extensor strength, peak oxygen consumption and peak workload were lower (all $P \leq 0.021$). Related to fat free mass (FFM), strength measures and peak performance remained unchanged (all $P \geq 0.245$). Compared to controls, TLS- and TUG-performance, and strength did not significantly differ (all $P \geq 0.115$). Also, postoperative absolute and BM-related peak oxygen consumption and workload were similar to matched controls (mean difference of patients vs controls: -0.37 ± 0.63 L/min; -6.2 ± 10.3 mL/min/kg; -28.6 ± 38.6 W; -0.36 ± 0.56 W/kg; all $P \geq 0.145$), while FFM-related values were significantly lower (both $P \leq 0.045$).

Conclusion: One year after RYGB, most physical functioning parameters were comparable to those of controls, but cardiorespiratory fitness tended to still be impaired. Although not statistically significant, the average

difference of absolute and BM-related peak oxygen consumption between operated subjects and non-operated matched controls is of clinical importance (1).

Acknowledgement: *BS and CMS contributed equally to this work.

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Disclosure: No conflict of interest declared

PO3.101

The effects of Ramadan fasting on resting metabolic rate in healthy non-obese individuals

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Background and Aims: Fasting during the month of Ramadan entails abstinence from eating and drinking between dawn and sunset. Weight loss may be seen in some patients, but is often followed by weight regain after Ramadan. There are associated changes in several hormones and circadian rhythms; whether these are accompanying by changes in energy metabolism is unclear. We investigated the effect of Ramadan fasting on resting metabolic rate (RMR).

Material and Methods: Healthy non-obese volunteers (n = 29, female : male = 16:13, age = 33.3 ± 8.7 years) fasting during Ramadan were recruited from staff working at the Imperial College London Diabetes Centre. Measurements were performed during and after Ramadan. RMR was measured following nine hours of fasting using indirect calorimetry (Cosmed Quark RMR). Body composition was measured using bio-impedance (SECA 515).

Results: No significant difference in mean RMR in Ramadan (1361 ± 232.2 kcal/day) and post-Ramadan (1362 ± 273.6 kcal/day) periods was observed. Weight, fat mass and fat free mass were similarly unchanged in the two periods. However, individual differences were seen in RMR trends. The change in RMR after Ramadan ranged from an increase of 446 kcal/day in one patient to a reduction of 342 kcal/day in another patient (Figure 1). There were no specific predictors of the direction and magnitude of RMR change.

Conclusion: In the healthy population studied, no overall change in RMR was seen with Ramadan fasting. However, major intra-individual differences in the direction and magnitude of RMR changes were observed. Differences in diet and activity are likely to be more important contributors to weight change with Ramadan fasting. Effects of Ramadan fasting on other aspects of energy expenditure including activity and thermic effect of food await further studies.

Disclosure: No conflict of interest declared

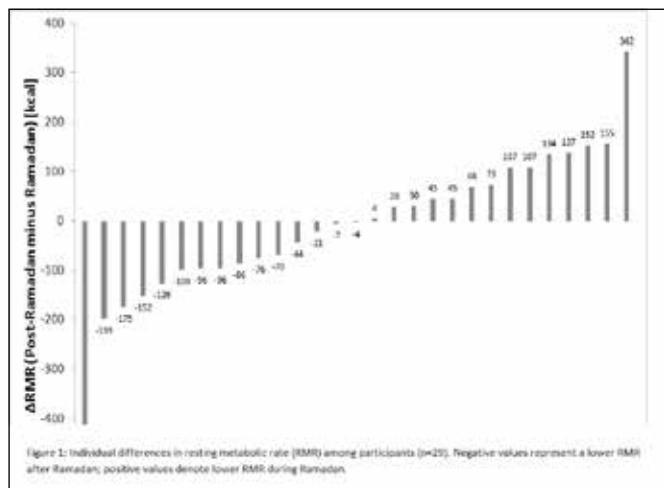


Fig. 1

PO3.102

Changes in iron absorption after Roux-en-Y gastric bypass

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Background and Aims: Iron deficiency is one of the most common deficiencies after Roux-en-Y gastric bypass (RYGB). In most patients the development of these deficiencies is multi-factorial, including poor adherence to supplementation, gender, age, and type of bariatric procedure. Little is known about the uptake in non-deficient patients and preventing iron deficiencies. Since we cannot prevent all patients from developing an iron deficiency, it is important to gain further insight in the physiology of iron absorption after RYGB. Therefore this prospective study was initiated to examine the difference in iron absorption before and after RYGB in morbid obese females. Additionally, the difference in uptake between the two most common used oral supplements, ferrous fumarate and ferrous gluconate, was determined.

Objectives: To study iron absorption characteristics and changes before and after RYGB.

Material and Methods: A 9-hour iron absorption test was performed pre-operatively and 1 month postoperatively in 24 obese women who were eligible for RYGB: 12 were tested with a single dose of 600mg ferrous fumarate (195mg of elementary iron, group 1), and 12 patients received a single dose of 1390mg ferrous gluconate (160mg of elementary iron, group 2). Iron, transferrin, total iron binding capacity, iron saturation (TIBC) and ferritin, were measured before (T0) and every hour after intake of the supplement (T1-T9). During the tests patients were kept on a low-iron diet.

Results: Before surgery there was no significant difference in absorption between the 2 groups (figure 1 and 2). Postoperatively, there was a decrease in absorption in group 1 ($p < 0.001$), which was not present in group 2 ($p = 0.134$). There was a significant difference in absorption between the 2 groups 4 weeks after surgery ($p = 0.037$ at T1).

Conclusion: Comparing the iron absorption before and one month after RYGB, 4 weeks postoperative there was a lower uptake of iron in patients who were using ferrous fumarate. These findings indicate that there is in fact a difference in the iron absorption between ferrous fumarate and ferrous gluconate after RYGB, in favor of ferrous gluconate.

Disclosure: No conflict of interest declared

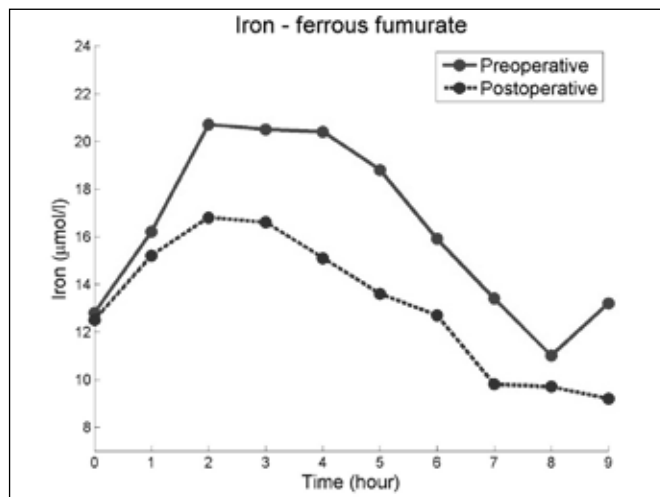


Fig. 1

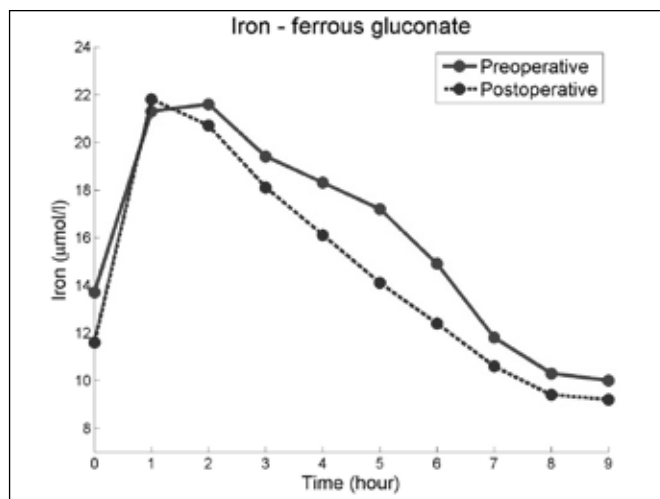


Fig. 2

PO3.103

It is possible to by-pass the learning curve in bariatric surgery?

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Objectives: The Learning Curve (LC) represents a concept which refers to the acquisition of a new technique in any domain supposing to guide training and implementation at institutions not currently using the new procedure, in bariatric surgery being a complex process starting with selection of cases, perioperatively management and treatment of complications.

Material and Methods: There were included 120 patients operated in the 3rd Surgical Unit between June 2012 and December 2015 divided in 3 groups of 40 patients and the main parameters were analyzed.

Results: Univariate analysis revealed a significant decrease of the operative time in the 3rd lot (70 +/- 20 minutes) comparing with lot 1 (90 +/- 15 minutes) and a significant decrease of incidents and complications following the learning curve: lot 1 - 13,33% (4 / 30), lot 2 - 3,33% (1/30) and lot 3 with 0 complications.

Conclusion: The results can be biased by retrospective design of the study with the lack of follow up for all the patients. On our cohort (120) the estimation of the breaking point for fulfilling the LC is to be after 80 patients in accordance with literature data. One of the most important methods to shorten the LC is to initiate and maintain a mentored communication with an experienced bariatric surgeon from a specialized centre to proper recognize and manage the incidents and complications. The concept “once seen, once done, once teach” is not available in surgery, the LC in bariatric surgery being reported to be 100 cases.

Disclosure: No conflict of interest declared

PO3.104

Efficacy of oral versus intramuscular vitamin B12 supplementation following Roux-en-Y gastric bypass

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Background and Aims: After Roux-en-Y Gastric Bypass (RYGB) surgery patient often develop a vitamin B12 deficiency. This is caused by a combination of reduced food intake and a lack of gastric acid and intrinsic factor postoperatively.

Objectives: Investigate whether oral supplementation efficaciously increases and normalizes vitamin B12 concentrations (serum vitamin B12 > 200 pmol/L) in deficient RYGB patients, as compared to conventional intramuscular injections.

Material and Methods: A randomized controlled trial in vitamin B12 deficient RYGB patients. Group 1 received a daily dose of oral methylcobalamin supplementation (1000 µg) and group 2 received bimonthly intramuscular hydroxocobalamin injections (2000 µg as loading dose, with doses of 1000 µg at follow-up) for six months. Serum vitamin B12 (primary outcome), was determined at baseline (T0) and at 2 (T1), 4 (T2) and 6 (T3) months after the first treatment. Secondary markers, methylmalonic acid (MMA) and homocystein (HC) levels, were measured at T0 and at T3.

Results: Fifty patients were included, 23 in group 1 and 27 in group 2. Mean vitamin B12 level at inclusion time was 170 ± 22 pmol/L, this was comparable in both groups. At T1 vitamin B12 deficiency disappeared in 96% of patients in group 1 and 93% in group 2 ($p = 0.56$). At T2 vitamin B12 deficiency disappeared in 95% of group 1 and 100% in group 2 ($p = 0.45$) and at T3 in 100% in both groups. Mean vitamin B12 levels at T3 were 333 ± 98 pmol/L in group 1 and 378 ± 165 pmol/L in group 2 ($p = 0.46$). MMA was raised in 61% in group 1 and 63% in group 2 at T0 and normalized in 95% versus 100% at T3 ($p = 0.45$). At T0 HC was raised in 70% of patients in both groups ($p = 0.60$) and normalized at T3 in 78% of group 1 versus 91% in group 2 ($p = 0.24$).

Conclusion: The efficacy of oral vitamin B12 supplementation was not inferior to that of hydroxocobalamin injections in the present study. Oral supplementation might be used as alternative to hydroxocobalamin injections to treat vitamin B12 deficient RYGB patients.

Disclosure: No conflict of interest declared

PO3.105

Volume of resected stomach seems to correlate with 1-year weight loss. MDCT scan measurement of gastric volume pre and post sleeve gastrectomy.

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Background and Aims: Laparoscopic sleeve gastrectomy (LSG) has enormously grown in popularity worldwide for the treatment of morbid obesity. The aim of this study was to determinate if the volumes of the resected

and remnant stomach measured by multi-detector CT scan are predictors for effectiveness of the percentage of excess weight loss 1 year after LSG.

Material and Methods: 39 patients with BMI > 40 kg/m² or > 35 kg/m² and medical comorbidities underwent LSG between January 2012 and October 2014 and were analysed prospectively. 101 multislice computed tomography data sets acquired in those patients (28 female and 11 male) were evaluated for gastric volume with a dedicated examination protocol. CT scans were performed preoperatively and 2 months and 1 year after surgery. Parameters were compared to percentage of excess weight loss (%EWL) at 1 year.

Results: Mean preoperative BMI of patients was 45.02 kg/m², and mean preoperative stomach volume was 664.7 ml. A significant correlation was observed between preoperative gastric volume and preoperative weight ($p = 0.023$, $r = 0.406$). One year after surgery the mean %EWL was 61.1% and the mean BMI was 31.5 kg/m². A significant correlation was found between the differences in volume of the stomach (preoperatively and 2 months and preoperatively and 1 year) and the %EWL. At 2 months after surgery, the mean difference in gastric volume was 574.4 ml with statistical correlation with the %EWL at 1 year ($p = 0.010$ and $r = 0.508$). At 1 year after surgery the mean difference in gastric volume was 503.5 ml, also with statistical correlation with %EWL at that moment ($p = 0.022$ and $r = 0.446$). No differences were found between the %EWL at 1 year and the remnant volume at 2 months ($p = 0.452$ and $r = 0.178$) or at 1 year ($p = 0.302$ and $r = 0.191$).

Conclusion: The differences in the volume of the stomach, measured by CT scan pre and postoperatively, seems to correlate with %EWL 1 year after surgery.

Disclosure: No conflict of interest declared

PO3.106

Three and a half years of bariatric surgery at the „St. Spiridon” Hospital – experience of the anesthetic team.

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Objectives: Bariatric surgery is a challenge for anesthetic/surgical team because the obese patient represents a high risk due to his/hers comorbidities.

Material and Methods: We analyzed 173 cases of gastric sleeve through celioscopic approach performed between 2012 and 2015 at the St. Spiridon Hospital from Iasi.

Results: The 173 studied patients are distributed as follows: 64% women and 36% men. The age of the patients is between 20 and 63 years. The BMI for these cases is between 32 and 60 kg/m². We evaluated the morbidity risk associated with bariatric surgery and created 3 risk classes (reduced, medium and high) based on a score computed from the following parameters (>45 years, male, BMI > 50 kg/m², HTA and pulmonary embolism). Based on this score 40% of the patients were considered to represent a medium risk and 12% a high morbidity risk. When analyzing the intubation difficulty, we found it to be hard in 3 cases (more than 3 intubation attempts) and medium in 23 cases (a bougie was necessary). 40% of patients were extubated in the operating room, the remaining 60% were extubated in 4–6 hours after the surgery ended. We also noticed one case of hemorrhagic shock, one case of rhabdomyolysis and one patient with significant comorbidities that developed peritoneal infected hematoma and organ dysfunction.

Conclusion: Although morbidly obese patients are associated with a high anesthetic risk we did not encounter major problems in the 173 cases operated in St. Spiridon Hospital from Iasi, Romania.

Disclosure: No conflict of interest declared

Changes in incretins and bile acids after Roux-en-Y Gastric Bypass

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Background and Aims: Roux-en-Y Gastric Bypass (RYGB) surgery is an accepted treatment for morbid obesity. Several variants have been described with varying lengths of the Roux- and biliopancreatic limb (BPL). A recent randomized controlled trial performed in our institutes showed 10% additional excess weight loss in patients with the longer BPL of 150cm (LBPL-RYGB), compared to the standard BPL of 75cm (S-RYGB). The physiology of the differences in weight loss are not yet fully understood, a common hypothesis includes changes in gut hormones (i.e. incretins) and bile acids.

Objectives: The aim of this study is to compare changes in gut hormones and bile acids after LBPL-RYGB compared to S-RYGB in female patients.

Material and Methods: Ten female patients, age-matched, without comorbidities were included and underwent two measurements, preoperatively and four weeks postoperatively. Blood levels of GLP-1, glucose, insulin, FGF-19, FGF-21, ghrelin and PYY are determined after an overnight fast and 30, 60, 120, 180 and 240 minutes after consumption of a standardized meal.

Results: Our hypothesis includes different gut hormone and bile acid levels after LBPL-RYGB compared to S-RYGB. At this moment all preoperative measurements have been performed and no differences are observed between these groups. Postoperative measurements are under review and all results and working mechanisms will be presented at the congress. Expected results includes increased postprandial release of PYY and GLP-1, which may induce enhanced satiety and increased weight loss. Bile acids are thought to play a role in the improved glucose metabolism after RYGB, fasting bile acid levels are higher in patients after RYGB compared to BMI-matched individuals.

Conclusion: A longer BPL results in a 10% additional excess weight loss compared to a standard BPL length. A difference in gut hormone and bile acid response after the longer BPL compared to the standard BPL is thought to contribute to this increased weight loss.

Disclosure: No conflict of interest declared

Obesity genetics in bariatric surgery

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Background and Aims: The number of patients with obesity continues to increase worldwide, together with comorbidities, such as diabetes mellitus and some types of cancer. Innumerable amounts of literature focuses on diets, physical activity adjustments, followed by bariatric interventions. At our center, an average excess weight loss of approximately 60–70% is achieved after RYGB.

The amount of weight loss varies widely among patients and depends on many different factors, such as implicated diet changes or changes in gut hormones. Little is known about underlying obesity related genes. A number of genes have indeed been identified that, when mutated, can cause obesity in humans. Nevertheless, mutations in these genes (e.g. MC4R, POMC, LEP, LEPR, PCSK1) explain no more than ~6% of the heritability shown by twin studies. Next generation sequencing techniques now provide a time- and cost-efficient method to identify mutations in large panels of known disease genes and to additionally screen a large number of candidate genes involved in or associated with a trait.

Objectives: To research the prevalence of the obesity related genes and to identify new obesity related genes in a morbid obese population.

Material and Methods: We developed a custom NGS enrichment kit (the 'Obesitome') aimed at enrichment of 255 either known obesity genes or putative obesity candidate genes. Analysis of 51 obesity related genes is offered as a diagnostic analysis through our genome-diagnostics laboratory. The remaining 204 candidate genes can be analyzed in a research setting, to identify novel obesity-related genes.

Results: Here we present the clinical and molecular results of the first cohort (n = 745) of morbid obesity patients that underwent bariatric surgery. We identified known and novel pathogenic obesity gene mutations in approximately 10–15% of the investigated patients.

Conclusion: These preliminary results might indicate which obesity genes predict possible surgery outcomes, in terms of excess weight loss and remission of comorbidity, after bariatric surgery, i.e. gastric bypass. This study will increase our understanding of the pathophysiological mechanisms of obesity and ultimately lead to personalized medicine of morbid obesity.

Disclosure: No conflict of interest declared

The addition of Hiatal Hernia Repair to Laparoscopic Sleeve Gastrectomy is safe and not associated with added morbidity: Analysis of the ACS-NSQIP Database

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Background and Aims: Laparoscopic Sleeve Gastrectomy (LSG) has become the most common bariatric surgical procedure worldwide. Gastro-esophageal acid reflux disease (GERD) is one of the most common long-term side effects of LSG. Some studies have suggested that concomitant hiatal hernia repair (HHR) during LSG reduces the risk GERD. However other investigators have refuted this claim, so HHR during LSG remains controversial. Little is known about the safety of adding hiatal dissection and cural repair in this setting.

Objectives: The present study aims to compare the 30-day morbidity and mortality and length of hospital stay between patients undergoing LSG alone and those undergoing LSG with HHR and to study the effect of concomitant HHR on major post-operative outcomes.

Material and Methods: Data from the American College of Surgeons National Surgical Quality Improvement Program 2010–2014 was analyzed using specific Current procedure terminology (CPT) codes. Univariate and Multivariate analysis was performed.

Results: Between 2010 and 2014, 32581 patients underwent LSG. Of those 4687 (14.4%), underwent concomitant HHR. Patients undergoing LSG with HHR were older (Mean age 46 vs. 43 years), more likely female (84.3% vs. 77.1%, $p < 0.05$) and less heavy (Mean body mass index (BMI) 44.6 vs. 46.4, $p < 0.05$). No significant differences in 30-day mortality, overall morbidity, reoperation, sepsis as well as wound, cardiac, respiratory and renal complications were found between the two study groups on univariate and multivariate analysis. Length of hospital stay was lower in the LSG +HH group (1.8 vs. 2.2 days, $p < 0.05$) even on multi-variate analysis.

Conclusion: Concomitant HHR at the time of LSG is not associated with increased risk of 30-day mortality or major morbidity. However, the effectiveness of this additional procedure should be assessed using long-term data on the resolution of GERD symptoms after the operation.

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Disclosure: No conflict of interest declared

Revisonal surgery for patient with Primary Obesity Surgery Endolumenal [POSE] procedure previous to conversion to sleeve gastrectomy

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Background and Aims: We report our initial experience describing the revisonal surgery for patient with Primary Obesity Surgery Endolumenal [POSE] procedure previous to conversion to sleeve gastrectomy (SG).

Objectives: The main objective is to show the possibilities to convert a previous POSE procedure to another type of bariatric proccesdure, either gastric bypass or sleeve gastrectomy. Understand the epossible pitfalls and complications related to the procedure. Another aim is to show the faisability and images related to the procedure.

Material and Methods: During th e2014, two (2) patients underwent conversion from previous POSE procedure to sleeve gastrectomy (SG). Both patients were females. One of the patient had a previous intragastric balloon in place. Boy Mass index were at the time of surgery 37 kg/m² and 39 kg/m². Patients underwent a complete preoperative study including endoscopy, nutritional assesment and psicological assesment. Hiatal hernia were checked. Patients underwent laparoscopic SG in a standars fashion, nicluding 5 trocar placement. Both stomach showed fundic partial plication, normal body of the stomach and in one case, partial antrum plication with severe stenosis and granulomatosis. Sticks were visible in both cases. Complete resection of the stomach was performed in both cases with a 40Fch bougie. A comlete reinforcement of the stomach was done with a prolene suture. Pathology analyses was performed showing complete granulomas related to the foreignn body reactionon the specimen.

Results: Patients did not have any postoperative complication and were discharged after 3 days. Mean %excess weight loss is 55% after 6 months mean follow-up. Intraoperative evaluation is mandatori and specially the placement of the previous endoscopic sutures. This can be evaluat-ed during the procedure with laparoscopic vision. If needed endoscopy should be used intraoperatively. In some cases, POSE does not include antral stickes. this must be considered when deciding the type of conversion to do either to a gastric bypass (GBP) or SG.

Conclusion: REvisonal surgery from POSE endoscopic procedure to SG or GBP can be challanging and some preoperative aspects and techncal aspects must be considered.

Disclosure: No conflict of interest declared



Fig. 1

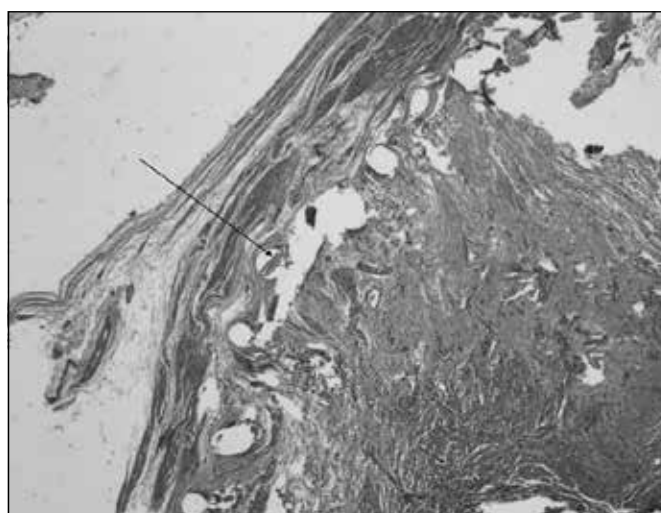


Fig. 2

Health Related Quality of Life after RYGB; effect of weight change

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Background and Aims: Recent publications describe a wide variation in the effect of bariatric surgery on Health Related Quality of Life (HRQOL). This variation might be explained by the numerous questionnaires used in bariatric surgery. In addition the effect of weight is unknown.

Objectives: This study evaluates the relationship between weight loss and HRQOL using a disease-specific (Impact of Weight on Quality of Life-Lite, IWQOL-L) and a generic (RAND-36) measurement of HRQOL in laparoscopic Roux-en-Y gastric bypass (RYGB) patients.

Material and Methods: 2137 primary RYGB patients were included if HRQOL measurements were available at baseline and 15 months post-surgery. IWQOL-L consists of a total score and 5 domains (physical function, self-esteem, sexual life, public distress, work) and RAND-36 of 2 subtotal scores (physical health summary, mental health summary).

Results: Mean baseline Body Mass Index (BMI) was 44.5 kg/m², 83% was female. Total body weight loss (TBWL) at 15 months was 31%. HRQOL at 15 and 24 months was significantly related to %TBWL all (sub-) totals of both IWQOL-L and RAND-36 ($p < 0.05$ in all). Change in HRQOL was related to %TBWL in all but one domain of IWQOL-L, but not to emotional role functioning ($p = 0.120$) and physical role functioning ($p = 0.104$) of RAND-36.

Conclusion: HRQOL improves after RYGB. HRQOL is positively influenced by weight loss; a higher weight loss predicted better HRQOL and more improvement of HRQOL. The relationship between weight (-loss) and HRQOL was more apparent with the IWQOL-lite, this seems to be the appropriate questionnaire to assess the effect of bariatric surgery on HRQOL.

Disclosure: No conflict of interest declared

PO3.112

Risk of Metformin-associated Lactic Acidosis (MALA) after Gastric Bypass

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Background and Aims: Metformin is the drug of first choice in patients with type 2 diabetes mellitus (T2DM). Metformin associated lactic acidosis (MALA) is very rare, however, it has been suggested that metformin bioavailability and acid ketone bodies increases after Roux-en-Y Gastric Bypass (RYGB). This may lead to an increased risk of MALA in patients undergoing RYGB surgery.

Objectives: To examine whether RYGB surgery affects plasma lactate (PL) levels in T2DM patients treated with metformin (MET).

Material and Methods: Retrospective, longitudinal study of T2DM patients screened preoperatively (T0) and monitored until 3 months after RYGB (T3). Three groups were evaluated: 1) patients not using metformin (NO-MET, N = 27), 2) patients on a stable dose of metformin (MET, N = 91), and 3) patients with a decrease in metformin dose during the observation period (N = 38). Lactate levels ≤ 2 mmol/L were defined as normal.

Results: 156 patients were included. All groups were comparable for body weight, plasma creatinine, fasting glucose, and HbA1c. Preoperatively, 14% of de NO-MET and 34% of the MET patients had lactate levels > 2.0 mmol/L. Preoperative PL levels were significantly higher in patients on MET than NO-MET patients (2.0 ± 0.06 mmol/L versus 1.7 ± 0.11 mmol/L, $P = 0.024$). Postoperatively, PL levels decreased significantly in all groups by 0.36 ± 0.09 ($P < 0.001$), 0.47 ± 0.08 ($P < 0.001$), and 0.64 ± 0.13 ($P < 0.001$), respectively. Renal function did not change. At T3, mean PL levels were comparable for all three groups.

Conclusion: This study does not support the hypothesis that T2DM patients on metformin have an increased risk of MALA after RYGB surgery. The decrease in lactate levels in all groups after surgery may be related to a decrease in adipocyte lactate production.

Disclosure: No conflict of interest declared

PO3.113

Robotic versus laparoscopic Roux-en-Y gastric bypass: Comparison of short-term surgical outcomes

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Background and Aims: Roux-en-Y gastric bypass (RYGB) is the most common and successful surgical weight-loss procedure and RYGB performed laparoscopically remains the gold standard in bariatric surgery. Robotic surgery can overcome some limitations of laparoscopic surgery.

Objectives: This study aimed to compare robotic RYGB with laparoscopic RYGB in short-term surgical outcomes.

Material and Methods: Between September 2014 and January 2016, 45 patients underwent robotic or laparoscopic RYGB for morbid obesity: 26 robotic and 19 laparoscopic. We performed a comparative analysis between two groups for short-term surgical outcomes.

Results: The clinical characteristics were similar between the two groups. Compared with the laparoscopic group, the robotic group had less intra-operative blood loss (60 vs. 115 ml, $P < 0.05$) and higher mean operation time (212 vs. 178 min, $P < 0.05$). No significant differences were observed in the time to flatus passage, days of eating liquid diet, and length of hospital stay. In addition, no difference was indicated in the incidence of post-operative morbidity. There was no mortality and leak in two groups.

Conclusion: Robotic RYGB seems to be a safe and effective alternative to laparoscopic RYGB in short-term surgical outcomes.

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Disclosure: No conflict of interest declared

PO3.114

Effects of gastric bypass surgery and weight reduction on Anti-Müllerian Hormone

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Background and Aims: In Sweden, 76% of patients seeking surgical treatment for obesity are women, 49% of those in reproductive age. Although not recommended, many patients get pregnant soon after surgery. This could be due to enhanced fertility after surgery. Anti-Müllerian Hormone (AMH) is widely used to evaluate the ovarian reserve and is thought to correlate to the number of growing follicles. The aim of this prospective study was to evaluate whether the level of AMH is affected by massive weight loss induced by bariatric surgery.

Material and Methods: Laparoscopic Roux-en-Y gastric bypass (LRYGB) was performed on 48 obese women aged 18–35 years. Baseline (BL) was before a 3–4 weeks preoperative period with caloric restriction (CR) using a very low calorie diet (VLCD). Body weight and height were measured at BL, on the day of operation and one year postoperatively and a questionnaire regarding contraception, menstrual patterns and symptoms of polycystic ovary syndrome (PCOS) was answered. AMH, testosterone and sex-hormone-binding globulin (SHBG) were analyzed at BL, preoperatively, and at six and twelve months postoperatively.

Results: BMI (mean, (SE)) at BL was 41.0 (3.7), 38.6 (3.5) on the day of operation and 26.5 (3.6) at one year. Median AMH levels were 30.0 pmol/L at BL and 35.0 after CR, $p = 0.014$. Median AMH at six and twelve months postoperatively were lower, 19.5 and 18.0 respectively, $p = 0.001$. The ratio of testosterone/SHBG was significantly lower after twelve months, 0.012 compared with BL 0.035, $p = 0.000$. There was no correlation between

AMH and body mass index, nor was there any difference in AMH levels between the patients with suspected PCOS, and those without.

Conclusion: AMH seems to be affected by short term CR, as levels were higher after VLCD. After LRYGB on the other hand, values decreased. These findings provide novel information about the hormonal consequences of gastric bypass surgery related to female fertility.

Disclosure: No conflict of interest declared

PO3.115

Assessment of regenerative processes in the stomach wall in case of staple-line glue protection in sleeve gastrectomy simulation with rabbits: The experiment methodology

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Objectives: In order to morphological assessment of regenerative processes in the stomach wall in the area of staple suture in the experiment with rabbits was produced staple-line simulation in sleeve gastrectomy. In this study we evaluated the staple-line in case of cyanoacrylate glue protection, staple-line suturing and the resection line without any additional protection.

Material and Methods: Twelve domestic rabbits were used in the study. The simulation of staple-line suture such as staple-line in sleeve gastrectomy was made to all animals after the laparotomy. The resection was made by using a linear stapler and blue Covidien cartridges (3.5 mm, the length 60 mm). One cartridge was used for one rabbit. The underrunning was made toward the esophagogastric junction. In the index group, consisting of 6 animals, the 0.3 mm of glue „Sulfacrilat“ (cyanoacrylate) was applied on the staple-line. After 3 minutes of exposure and the complete drying of the glue laparotomy wound was closed. The control group consisted of 6 rabbits. 1/2 staple-line with each animal in the control group was closed with a buried continuous suture safil 3-0, the half of the line remained without protection. Animals were get out of the study after 2 weeks. After the second laparotomy the macroscopical evaluation of the stomach wall in the surgical interference zone was carried out. The area of the gastric wall with the staple-line excised was resected for the next microscopic examination.

Results: In the macroscopic assessment of the staple-line coated by glue noticed a more obvious adhesive process, appearance aseptic inflammation. The failure of the staple-line hasn't been identified neither in the index group nor in the control group. All zones of stomach wall tissues in the underrunning zone and contiguous sections of stomach wall were examined by microscopic assessment.

Conclusion: The experimental model of the sleeve gastrectomy is implemented with rabbits and allows to make an assessment of the stapler-line under various types of protection and without protection at an early period after surgery.

Disclosure: No conflict of interest declared

PO3.116

Laparoscopic Roux-en-Y Gastric Bypass Versus Laparoscopic Sleeve Gastrectomy: A Single Center Experience

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Background and Aims: The laparoscopic Roux-en-Y gastric bypass (LRYGB) is the most commonly performed bariatric procedure, followed by laparoscopic sleeve gastrectomy (LSG). There are only a few studies which compares the outcomes of LRYGB vs LSG from a single surgical center. This study reports our experience after 152 consecutive patients who had undergone LRYGB or LSG, and compares the safety, the weight loss and the resolution of comorbidities.

Material and Methods: Between January 2004 and December 2010, 152 morbidly obese patients underwent non-revisional bariatric surgery, out of whom 80 patients underwent LSG and 72 patients underwent LRYGB. Technical aspects of the operation, results concerning morbidity, progressive weight loss and resolution of co-morbidities were retrospectively reviewed.

Results: Rates of excess weight loss (EWL) for the patients who had undergone LRYGB at 6 months, 1 year, 3 years and 5 years were 56.1%, 73.4%, 74.6% and 78.4% respectively. Rates of EWL for the patients who underwent LSG at 6 months, 1 year, 3 years and 5 years were 53%, 65.2%, 66.5% and 55.8% respectively. Patients' highest rate of EWL was achieved 5 years postoperatively for LRYGB and 18 months postoperatively for LSG. These rates were inversely related with preoperative age, Body Mass Index, and the existence of preoperative co-morbidities. LSG with a BMI between 35 and 55 achieved a similar %EWL to LRYGB in the first 12 months ($p < 0.05$). However, %EWL for LRYGB was significantly higher than LSG at the next 4 years. Thirty-day complication and readmission rates for LRYGB and LSG were (2 and 1% vs 0.6 and 0.3%, respectively $p > 0.05$).

Conclusion: LSG have a better safety profile comparing to LRYGB. However, after the first year, LRYGB patients achieved a considerably higher EWL compared to LSG patient. Randomized clinical trials are needed to better elucidate our findings.

Disclosure: No conflict of interest declared

PO3.117

A matched pairs analysis between the mini gastric bypass and the roux-en-y gastric bypass

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Background and Aims: The Roux-en-Y gastric bypass (RYGB) still remains the number one bariatric procedure worldwide with continued sustainable long-term results. However, several alternative procedures are on the rise according to international surveys. One of these inclining operations is the mini (or omega loop) gastric bypass (MGB) that is increasingly reported to be safe and efficient. But it is still a matter of ongoing discussion whether MGB can achieve comparable or perhaps better results than the gold-standard operation RYGB. The aim of our study was to compare the perioperative and early postoperative outcome of these two procedures.

Objectives: The aim of our study was to compare the perioperative and early postoperative outcome of these two procedures.

Material and Methods: Data of our MGB and RYGB patients were prospectively collected, and 170 patients were matched for age, gender and BMI at baseline. Two groups each consisting of 85 patients were compared for perioperative outcome and postoperative course within the first two years.

Results: Preoperative BMI was 49.8 ± 4.1 kg/sqm in MGB vs. 48.1 ± 4.1 kg/sqm in RYGB. Mean operation time (79 ± 23.7 min. vs. 117.6 ± 50.4 min.) was shorter when performing MGB. Conversion rate was 0% in MGB vs. 1.2% in RYGB. Intraoperative complications were less in MGB (2.4% vs. 7.1%). Postoperative (major) complication rate was 4.7% in MGB vs. 5.9% in RYGB. Perioperative (30 days) mortality was 0% in both groups. Furthermore, stenosis requiring endoscopic dilatation was noted in 12.9% in RYGB. Mean excess weight loss (EWL) in MGB was slightly lower after one year ($68.8\% \pm 14.2$ vs. $75.8 \pm 15.2\%$), but comparable after two years ($73.4\% \pm 16.8$ vs. $77.3 \pm 16.0\%$). The rate of revisional surgery was also lower in MGB (3.5% vs. 7.1%).

Conclusion: Both MGB and RYGB are safe and feasible options in bariatric surgery with very good results for EWL within the first 2 years. However, shorter operation time, less major perioperative complications and a lower revisional surgery rate are in favour of MGB.

Disclosure: No conflict of interest declared

PO3.118

Insitu infection of intragastric balloons – case report

[no abstract]

PO3.119

Laparoscopic reanastomosis due to gastrojejunal stenosis after gastric bypass

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Background and Aims: Our patient underwent a gastric banding procedure in 2006 due to a BMI of 50 (172,6kg, 1,85m) and lost 15 kg in the following months. Three years later he presented himself with weight regain and switched to a sweet eating disorder. Firstly we tried conservative therapies that showed to be without effect.

So we decided to perform a gastric bypass. The operation was undertaken in July 2010. Until September 2011 the patient was fine when he introduced himself in the ambulatory because of severe reflux disease. In the gastroscopy a marginal ulcer and gastroesophageal reflux signs were discovered. After setting the patient on PPI he was free of any symptoms.

In October 2013 the patient presented himself with massive dysphagia. We found a severe stenosis at the gastrojejunal anastomosis. A balloon dilatation was performed three times when we decided to do a reanastomosis of the anastomosis.

In February 2014 the operation took place and three days after the surgery the patient was dismissed into home care.

Results: The patient was controlled in the ambulatory 4 weeks, 3 months, 6 months and 12 months after the procedure (due to our follow-up care for bariatric patients).

He regained weight is now stable at 90kg.

Conclusion: A reanastomosis of the gastrojejunal anastomosis due to stenoses is a safe and effective procedure, especially when dilatation is ineffective.

Disclosure: No conflict of interest declared

PO3.120

Revision bariatric surgery: The RNY gastric bypass as last resort

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Background and Aims: A 44-year-old female patient was seen in our outpatient clinic. In 1998 she underwent an open Mason gastropasty. With this procedure there was a weight loss of 20kg and a BMI reduction from 40,3 (98kg) to 32 (78kg). Unfortunately she had complaints of vomiting and weight regain because of maladaptive eating. In 2007 she underwent a duodenal switch in another bariatric center. With this last procedure she lost 10kg. There was a BMI reduction from 33 (81kg) to 29 (71kg). This patient consults our outpatient clinic with severe complaints of reflux, vomiting and weight regain. At this moment her weight is 81kg, BMI 33. The barium swallow X-ray shows a dilated esophagus, a prominent gastric pouch, slow passage of food and a sliding hernia. Gastroscopy shows reflux esophagitis, a narrowing at the gastropasty and a narrowing at the duodenojejunostomy.

Conclusion: In this complicated case we successfully performed a conversion to a laparoscopic RNY gastric bypass. The patient did very well

postoperatively. She could start eating on postoperative day 2 and was discharged on postoperative day 3. In this video we demonstrate the difficulty of the case and the several pitfalls we encountered. We strongly believe that the RNY gastric bypass remains an ideal salvage procedure for highly complicated bariatric surgery cases.

Disclosure: No conflict of interest declared

PO3.121

Video Presentation: Re-do surgery-eroded gastric band – laparoscopic sleeve gastrectomy

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Background and Aims: Video Case Presentation : Re-do surgery-eroded gastric band – laparoscopic sleeve gastrectomy 38 years old female underwent Lap. Gastric Banding (MID-BAND) 12 years ago in our clinic. BMI was 49 at that time. %45 excess weight loss was achieved in first 5 years under f/u. After pregnancy and section delivery 5 years ago patient was lost to follow-up.

Objectives: In this January patient came to follow-up with new BMI of 45 kg/m². Patient had port-infection and band erosion which was revealed with gastroscopy.

Material and Methods: Endoscopic band removal was unsuccessful due to position of the band. Port was removed under local anesthesia with antibiotic treatment 3 weeks before surgery.

Results: Patient opted out for single-stage band removal and re-do sleeve gastrectomy even though risks were explained. The patient was discharged POD #5. Patient lost 35 kg in 9 months period without any complaints. Control gastroscopy at sixth months f/y showed a regularly shaped sleeve.

Disclosure: No conflict of interest declared

PO3.122

Video Presentation: Re-do surgery- failed laparoscopic gastrectomy to laparoscopic minigastric bypass in a bipolar patient.

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Background and Aims: Re-do surgery- failed laparoscopic gastrectomy to laparoscopic minigastric bypass in a bipolar patient. 48 years old female bipolar and Type 2 diabetic patient with a BMI of 56 kg/m² underwent laparoscopic sleeve gastrectomy in an outside clinic 7 years ago. Although patient lost some weight after surgery no metabolic benefit or extensive weight loss was achieved. Patient was on OAD and insulin treatment however her diabetes was uncontrolled. Patient regained weight just 1 year after the surgery and her new BMI was 49 kg/m². Special consent was obtained from the Psychiatry department for the surgery.

Material and Methods: Patient underwent re-do laparoscopic minigastric bypass 8 months ago. Patient was discharged on POD #10 because she needed inpatient psychiatric care after surgery. No need for diabetic medications and insulin 1 month after surgery. Patient lost 42 kg in 8 months period without any complaints. Patient is also psychiatrically stable since she is also in routine follow-up with psychiatry outpatient clinic.

Disclosure: No conflict of interest declared

PO3.123

Video Presentation: Revisional surgery – failed sleeve gastrectomy to re-sleeve gastrectomy

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Background and Aims: 36 years old female underwent laparoscopic sleeve gastrectomy in an outside clinic with a BMI of 40 at that time. She lost 22 kg in 1 year period. Patient had nausea, vomiting and solid food intolerance just after the first surgery. X-ray studies and gastroscopy studies showed an extensive remnant of fundus and twist and turn phenomenon due to irregularly shaped sleeve. Patient also complained of regurgitation after going to sleep.

Material and Methods: Patient underwent laparoscopic re-sleeve gastrectomy 5 months ago. Gastrografin swallow study at POD #4 showed a normal sleeve after the operation without any leaks. The patient was discharged POD #6. The patient lost 15 kg in 5 months period without any complaints. Control gastroscopy in 5th month showed a regular normal sleeved stomach without a fundus or stricture.

Disclosure: No conflict of interest declared

PO3.124

Laparoscopic management of sleeve migration by conversion into gastric by pass with mesh reinforced hiatoplasty

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Background and Aims: Sleeve migration is a frequent late-onset complication after laparoscopic sleeve gastrectomy (LSG) with uncertain incidence. Management of sleeve migration is challenging especially in absence of clear guidelines for its surgical management, while hiatoplasty and roux en-y gastric bypass (RYGB) are the best available options.

Material and Methods: The video shows the case of 61 years old male patient with BMI 47.1 kg/m², hypertension, type II diabetes, OSAS and dyslipidemia who underwent LSG in 2014. On follow up, BMI nadir was 25.4 kg/m² with resolution of co-morbidities, but the patient suffered from severe reflux symptoms (De novo GERD) uncontrolled by PPI. Endoscopy revealed esophagitis grade C (Los Angeles classification). The diagnosis of sleeve migration was confirmed by barium swallow and CT scan with 3D reconstruction (missed hiatal defect at the first procedure?).

Results: The procedure started with laparoscopic adhesiolysis, mobilization of the sleeve and the lower part of the esophagus intra-abdominally then careful dissection of the hiatal area and excision of the hernia sac. Hiato-plasty was performed with 3 interrupted non absorbable stitches and reinforced with synthetic absorbable Bio-A mesh fixed with fibrin glue. Then, double loop RYGB (Biliary limb 65 cm and alimentary limb 100 cm) was performed. After 6 months follow up, the patient stopped PPI treatment, reflux symptoms resolved and barium swallow was normal.

Conclusion: RYGB is an effective surgical option for sleeve migration with symptomatic GERD even in absence of weight regain. Concomitant hiato-plasty reinforced with absorbable synthetic mesh offer good reflux symptoms control.

Disclosure: No conflict of interest declared

PO3.125

Banded pouch for weight regain after gastric bypass

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Background and Aims: Weight regain after roux en-y gastric bypass (RYGB) is a challenging problem because the options for revisional surgery are not easy and usually associated with high complication rates. There is no consensus about the optimal options for weight regain after RYGB. Banding the gastric pouch has been reported as an effective and safe alternate in selected patients.

Material and Methods: The video presents two cases (BMI > 40 kg/m²) with weight regain 24 months after RYGB with enlarged gastro-jejunal anastomosis. Both had laparoscopic banded gastric pouch the first with a lap band 9.75 cm (Adjustable Gastric Banding System, Apollo endosurgery inc.) while the second with a Fobi ring 7.5 cm (Gastric bypass Ring, Fobi Ring, MV medical solutions S.r.l.).

Results: The procedure started with laparoscopic adhesiolysis, mobilization of the gastric pouch and its separation from the excluded stomach. Then the ring was inserted 2 cm above the gastrojejunostomy and fixed in place by 2–3 non-absorbable sutures to avoid its migration. Both patients were discharged the day after and the postoperative gastrographine swallow showed adequate pouch outlet. After 6 months follow up, both patients achieved 60% excess weight loss.

Conclusion: Banding the gastric pouch is an available option for weight regain after RYGB avoiding more complex interventions in selected patients. The durability of weight loss achieved at 6 months remain uncertain.

Disclosure: No conflict of interest declared

PO3.126

Laparoscopic Fistulo-jejunostomy to treat staple line leak following Laparoscopic Sleeve Gastrectomy

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Background and Aims: Staple line leak following Laparoscopic Sleeve Gastrectomy (LSG) can become a difficult and challenging problem to manage. A Roux-y-fistulo jejunostomy (Baltazar procedure) can offer a definitive treatment option.

Objectives: This video illustrates the technical steps showing how a Laparoscopic Baltazar procedure can be done with a hand-sewn Roux-y fistulo-jejunostomy

Material and Methods: 27 year old male patient with morbid obesity BMI 37 kg/m² and poorly controlled diabetes mellitus on Insulin underwent a Laparoscopic Sleeve Gastrectomy. His initial post-operative course was smooth and uneventful with rapid weight loss and remission of diabetes. Around five weeks post-op that patient developed high grade fever and was found to have a small contained leak at the level of the esophago-gastric junction. The patient was treated with intravenous antibiotics and naso-jejunal feeding with improvement early on. About a month later, the patient redeveloped fever and CT scan of the abdomen and pelvis showed a larger left sub-phrenic collection with a splenic abscess. The patient was taken to the Operating Room.

Results: The fistula site at the esophago-gastric junction was identified. The decision intra-op was made to proceed with a Laparoscopic fistulo-jejunostomy with Roux-y reconstruction. The patient recovered without further complications. The splenic abscess resolved with further antibiotic therapy. He is now in good health with stable weight and he is free from diabetes.

Conclusion: Laparoscopic fistulo-jejunostomy (Baltazar) is a good rescue operation for difficult to manage staple line leak following Laparoscopic Sleeve Gastrectomy.

Disclosure: No conflict of interest declared

PO3.127

Laparoscopic hiatal hernia repair is a safe and effective option for symptomatic hiatal hernia that develop after Laparoscopic Sleeve Gastrectomy

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Background and Aims: Reflux esophagitis and symptomatic hiatal hernias (HH) are common after laparoscopic sleeve gastrectomy (LSG). Most surgeons would agree that Laparoscopic Roux-y-gastric bypass ideal to treat patients with symptomatic HH after LSG. Reduction of the HH with crural repair is seldom described and little is known about its long-term results.

Objectives: The objective of this video presentation is to describe the technical elements of Laparoscopic reduction and repair of symptomatic hiatal hernias after Laparoscopic Sleeve Gastrectomy.

Material and Methods: Six patients presenting on average 24 (5–58) months after LSG with a symptomatic HH. The main presenting symptom was food intolerance and retrosternal chest or epigastric pain. Patients also complained of heartburn and regurgitation. Barium swallow and endoscopy showed herniation of the proximal part of the stomach in the mediastinum.

Results: Laparoscopic reduction and repair of the hiatal hernia was successful in all patients. The esophago-gastric junction was restored in the abdominal location and the crura were approximated with or without pledgets. Occasionally the stomach was sutured to the peri-pancreatic fascia for fixation. All patients' symptomatology have improved particularly swallowing and pain. Most still have heartburn but symptoms are well controlled on medications. The mean time from HH repair to last follow-up was 23 months (1–63).

Conclusion: Hiatal hernias often develop after LSG and in some cases can cause significant symptoms of food intolerance, pain and heartburn. Laparoscopic hiatal hernia reduction and crural repair may be suitable option in select patients, provided there is no stenosis or twist in the LSG. In that case, a Roux-y-gastric bypass would be a more suitable option.

Disclosure: No conflict of interest declared

PO3.128

Removing a gastric bypass and restoration of normal anatomic continuity

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Background and Aims: Gastric bypass is the gold standard in bariatric surgery with excess weight loss at 4 years of over 50% in morbidly obese patients. Its reversion is a rare procedure that can be performed by laparoscopy.

Objectives: It is the case of a 23 year-old woman who Roux-En-Y Gastric bypass elsewhere despite a psychiatric preoperative contraindication. This intervention caused subsequently chronic abdominal pain. A laparoscopy was performed and revealed an internal hernia that was reduced and an excess of jejunal stump below the gastrointestinal anastomosis that was resected. Despite this intervention, the patient did not notice any improvement and even rather described a new worsening with permanent abdominal pain. After multidisciplinary discussion and exclusion of all other possible causes, a complete reversion of the gastric bypass was performed 2 years after the initial intervention.

Material and Methods: Umbilical laparoscopy with a 12 mmHg pneumoperitoneum was performed and 12 mm paramedian trocar inserted in left quadrant, 5 mm left subcostal, 5 mm in the left hypochondrium and a sub-xiphoid liver retractor. Adhesiolysis allowed to identify hiatal region, digestive loop, biliodigestive loop and common loop. No abnormalities were noted. A disconnection of the gastrointestinal anastomosis

and Roux-en Y loop was performed, and continuity was restored by manual side-to-side gastro-gastric anastomosis and side-to-side mechanical jejunio-jejunal anastomosis.

Results: Postoperative course was uneventful. Radiological control on postoperative day 1 was normal (gastroesophageal transit). Refeeding was well tolerated and patient discharged after 7 days. During 1 month, the patient was relieved of her symptoms. She then developed severe abdominal pain again, for which we have no somatic explanation.

Conclusion: Roux-En-Y Gastric bypass is an intervention that can be reverted by laparoscopy as well. Indication of reversibility should be exceptional, and decided by a multidisciplinary team.

Disclosure: No conflict of interest declared

PO3.129

Phytobezoar post Roux -en -Y gastric bypass (Video)

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Background and Aims: Laparoscopic Roux-en-Y gastric bypass (RYGB) is one of the most performed bariatric procedures worldwide. Intestinal obstruction is reported between 1 and 4%, Phytobezoar as a cause of obstruction is not the most common, so we must be prepared to suspect and diagnose it. We present a case of intestinal occlusion caused by a phytobezoar 3 years after a RYGB.

Objectives: To show a video of a clinical case of bowel occlusion caused by phytobezoar and its resolution

Material and Methods: 41-year-old man with history of a RYGB who presents bowel occlusion signs and attends to emergency room. An abdomen and pelvic CT showed a stop at jejunio-ileal junction, distal to the jejuniojejunostomy, with dilatation of alimentary and biliary loops and peripancreatic edema. We decided to make a laparoscopy.

Results: During laparoscopy inspection we found bowel dilatation and a solid intraluminal mass at jejunio-ileal junction with normal ileum loops distal to the obstruction. We performed an enterotomy and we found rests of food that were evacuated into a specimen bag. Enterotomy was closed with linear stapler. He had uneventful recovery after surgery and was discharged the 5^o day.

Conclusion: Early and late bowel obstruction incidence after RYGB is about 3%. However, phytobezoar is not a frequent cause of this entity, described in less than 1,8% of the patients who underwent a RYGB. High fiber diet, binge eating, reduced size of the stomach and achlorhydria are the principal predisposing factors. Patients who underwent RYGB should receive specific nutritional counseling in order to avoid this complications.

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